

4.0 COMPARISON OF PROPOSED ACTION AND ALTERNATIVES TO IT

This chapter presents a summary of impacts that are expected to occur as a result of the construction and the operation of the Tongue River Railroad Company's (TRRC) proposed rail line. A more detailed analysis of the impacts, references, and the methodology used in the assessment is available in Appendix A. The order of topic presentation in this chapter corresponds to the sequence presented in Appendix A.

All data referring to the Proposed Action and each of the alternatives presented in this chapter assume the inclusion of the Ashland SE Alignment. Data for the Ashland NW Alignment are included separately when it differs appreciably from the Ashland SE Alignment. This information may be applied to the Proposed Action or to any of the alternatives.

The "No Action" Alternative is presented in accordance with available data. This alternative assumes that the proposed railroad and related mines will not be constructed (see Appendix B). In most cases, this course of action is reflected in the existing environment or in baseline growth projections.

4.1 LAND USE

4.1.1 Construction

The construction of the TRRC's proposed rail line would affect land use in the study area principally by requiring land for a right-of-way, for borrow material, for railroad-operating facilities, and for construction worker facilities. In addition, the proposed rail line would sever some parcels of land, perhaps rendering them unsuitable for continued agricultural use. Under the "No Action" Alternative, the proposed railroad and mines would not be constructed. Consequently, there would be no impacts to land use from this development.

4.1.1.1 Land Acquisition

Right-of-way

Most of the land (87 percent) that would be acquired for the TRRC rail line--regardless of the alternative route selected--is owned by private individuals. The federal government owns 12 percent of the required land, and 1 percent is owned by the State of Montana. The

construction of the TRRC rail line would impact 48 landowners, of whom 39 are agricultural producers (see Table 4-1). The right-of-way would require 1,762 acres; if the Ashland NW Alignment is considered, the total would be 1,725 acres. Most of the land (80 percent) is currently used for grazing livestock. The remainder serves as irrigated cropland (2 percent), nonirrigated cropland (4 percent), or is used for other purposes (14 percent). None of the land in the right-of-way is considered prime farmland, according to USDA Soil Conservation Service prime farmland designation criteria. Most agricultural producers (37) would lose less than 10 percent of their deeded acres, and no rancher would relinquish more than 15 percent.

TABLE 4-1

SUMMARY OF IMPACTS TO RANCHING OPERATIONS

	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE	ASHLAND NW ALIGNMENT ^a
(1) LOSS OF LAND USE (by acres)					
Due to Right-of-way					
Irrigated Cropland	37	68 ^b	40	5	8
Nonirrigated cropland	75	135	77	65	(17)
Grazing Land	1,435	1,450	1,600	970	(61)
Other Uses	<u>215</u>	<u>225</u>	<u>100</u>	<u>70</u>	<u>33</u>
SUBTOTAL	1,762	1,878	1,817	1,110	(37)
Due to Access Restrictions					
Irrigated Cropland	44	80 ^c	48	13	--
Nonirrigated Cropland	88	101	80	53	(3)
Grazing Land	<u>930</u>	<u>469</u>	<u>972</u>	<u>519</u>	<u>(141)</u>
SUBTOTAL	1,062	650	1,100	585	(144)
Due to Irrigation System Disruption ^d					
	415	-0-	405	100	--
TOTAL	<u>3,239</u>	<u>2,528</u>	<u>3,322</u>	<u>1,695</u>	<u>(181)</u>

^a Add (subtract) these figures to include the Ashland NW Alignment in each alternative

^b 17 acres prime farmland

^c 32 acres prime farmland

^d Existing and planned systems

TABLE 4-1. SUMMARY OF IMPACTS TO RANCHING OPERATIONS (continued)

	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE	ASHLAND NW ALIGNMENT ^a
(2) AFFECTED LANDOWNERS					
Number With Lands in Agricultural Use					
Severed Land ^b	38	41	36	25	2
Boundary Land ^c	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>-0-</u>
SUBTOTAL	39	42	37	26	2
Percent of Lands, by Land Owner, Removed from Production					
Less than 1.0%	18	17	15	10	2
1.1-2.5	9	10	10	7	-0-
2.6-5.0	5	6	5	2	-0-
5.1-7.5	3	1	3	2	-0-
7.6-10.0	2	2	2	2	-0-
10.1-12.5	1	1	1	2	-0-
12.6-15.0	1	2	1	1	-0-
Greater than 15.1	<u>-0-</u>	<u>3</u>	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>
SUBTOTAL	39	42	37	26	2
Number With Lands Not in Agricultural Use					
Severed Land	9	9	4	4	7
Boundary Land	<u>-0-</u>	<u>1</u>	<u>-0-</u>	<u>-0-</u>	<u>2</u>
SUBTOTAL	9	10	4	4	9
TOTAL NUMBER OF AFFECTED LANDOWNERS	<u>48</u>	<u>52</u>	<u>41</u>	<u>30</u>	<u>11</u>

(3) DISPLACEMENT OF CAPITAL IMPROVEMENTS

Existing Improvements					
Houses and Trailers	3	5	1	1	4
Other Buildings	1	1	1	1	1
Corrals/holding Areas	3	1	3	5	--
Wells/water Tanks	5	4	4	4	(1)

^a Add or subtract these figures to include the Ashland NW Alignment

^b parcels bisected by right-of-way

^c parcels bordering on, but not bisected by right-of-way

TABLE 4-1. SUMMARY OF IMPACTS TO RANCHING OPERATIONS (continued)

	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE	ASHLAND NW ALIGNMENT ^a
Irrigation Systems					
Existing Systems					
Disrupted	8	4	6	2	-0-
Existing Systems					
Displaced	2	-0-	3	-0-	-0-
Planned Systems					
Disrupted	3	-0-	2	-0-	-0-
Roads	6	2	4	1	3
Sewage Lagoon	1	1	0	-0-	-0-
Proposed Improvements					
Home Sites	1	-0-	-0-	-0-	-0-
Irrigation Systems	3	-0-	3	-0-	-0-

(4) CUMULATIVE LOSS OF AGRICULTURAL PRODUCTIVITY^b

Production Value (\$000s) Due to Railroad					
Cumulative Cattle	723	519	787	450	(67)
Production Crops	<u>2,718</u>	<u>1,167</u>	<u>2,692</u>	<u>311</u>	<u>1</u>
SUBTOTAL	3,441	1,686	3,479	761	(66)
Production Value (\$000s) Due to Mining					
Cumulative Cattle	1,165	1,165	1,165	1,165	--
Production Crops	<u>275</u>	<u>275</u>	<u>275</u>	<u>275</u>	--
SUBTOTAL	1,440	1,440	1,440	1,440	--
Production Value (\$000s) Due to Community Growth					
Cumulative Cattle	135	135	135	135	--
Production Crops	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	--
SUBTOTAL	235	235	235	235	--
TOTAL	<u>5,116</u>	<u>3,361</u>	<u>5,154</u>	<u>2,436</u>	<u>(66)</u>

^a Add (subtract) these figures to include the Ashland NW Alignment in each alternative

^b Medium coal production scenario

The construction of the TRRC rail line along the route of the Tongue River Road would impact more landowners (52) and more acres (1,878, or 1,841 with the Ashland NW Alignment) than would construction via the proposed route. The percentage of affected grazing land for this alternative route (80 percent) is the same as that for the proposed rail line. The percentage of irrigated cropland is higher for this route than for the proposed rail line--7 percent versus 2 percent. In addition, the Tongue River Road route includes approximately 17 acres of prime farmland. Along this route, 36 of the 42 landowners would lose less than 10 percent of their deeded acres to the right-of-way, whereas 3 landowners would relinquish more than 15 percent of their deeded acres.

The construction of the TRRC rail line along the route of the Moon Creek alternative would impact fewer landowners (44) but more acreage (1,817 acres, or 1,780 with the Ashland NW Alignment) than would construction of the proposed rail line. The percentage of affected grazing land for this alternative (90 percent) is higher than that of the proposed rail line. The percentage of irrigated cropland is slightly higher for this alternative--3 percent as opposed to 2 percent for the proposed route. Along the Moon Creek route, 35 of the 37 landowners would lose less than 10 percent of their deeded acres to the right-of-way, whereas no landowner would relinquish more than 15 percent.

The right-of-way for a rail line along the Colstrip route would disturb the fewest number of acres (1,110, or 1,073 acres with the Ashland NW Alignment) of the four possible routes. Grazing land remains dominant along this route (88 percent), whereas irrigated cropland is negligible (1 percent). Fewer landowners (30) would be affected by this alternative route than by the other three possible alignments. Along the Colstrip alignment, 23 landowners would lose less than 10 percent of their deeded land, whereas no landowner would relinquish more than 15 percent.

In the process of acquiring the necessary right-of-way, the proposed rail line would impact capital improvements. Construction would displace one occupied house, one unoccupied house, and one occupied trailer. Four houses and a trailer would be displaced with the Tongue River Road route. Land belonging to the Miles City Livestock Sales Yard would be acquired for the proposed rail line or the Tongue River Road route. The Moon Creek and Colstrip alternatives would each affect one house.

Two additional trailers would be displaced in the Sawmill Court with the Ashland NW Alignment. In addition, Eastmont Forest Products, Cal-Gas, and three private lots would be bisected by the Ashland NW Alignment. Ashland's lift station, sanitary sewer, and fire station would be bordered on one side by the route.

The alternative routes differ little from the proposed rail line in their impact to other capital improvements, although a slightly

larger number of corrals would be impacted along the Colstrip route than on other alignments. The proposed rail line and the Tongue River Road route would both displace the U.S. Fish and Wildlife Service's sewage lagoon at Miles City. This situation would not exist under the Moon Creek or Colstrip Alternatives. The Ashland NW Alignment would bisect several urban lots at Ashland. It is assumed that compensation would be provided by the TRRC for the loss of all capital improvements. In most cases, these improvements could be relocated off the right-of-way.

The TRRC's proposed rail line differs from the alternative routes in its impact to irrigation systems. An analysis of this impact (see section A1.1.1.2) indicates that eight existing systems would be disrupted and two existing systems would be displaced. It is assumed that the TRRC would assist ranchers in redesigning these systems. However, if these mechanical systems could not be redesigned to irrigate land parcels of different configurations, approximately 415 acres of irrigated cropland might be lost to agricultural production. Each of the alternative routes would disrupt fewer irrigation systems than would the proposed rail line.

As an aggregate, few irrigation systems would be disrupted by any route under study. The potential agricultural losses could be reduced by installing alternative sprinkling systems, where feasible, and by maintaining the currently irrigated cropland as nonirrigated cropland or as grazing land.

The construction of the proposed rail line or the Tongue River Road alternative route would traverse approximately 13 miles of the Livestock and Range Research Station (LARRS) near Miles City. Roughly 149 acres of station land would be acquired for either right-of-way. The affected research areas include the following: Fish Hatchery Site, Hill Pasture, Lower Flood Pasture, Hogback Unit, Tongue River Bend Pasture, 2-C Bend Pasture, No. 3 Pasture. Currently, a number of vegetation and livestock research projects are being conducted in these areas and could be affected. Of the affected pastures, the Hill Pasture and the Hogback Unit have the greatest potential for impact.

The proposed alignment and the Tongue River Road route would remove a large experimental exclosure and 14 smaller portable exclosures. This experiment was started in 1979 and is scheduled to end in 1984; thus, railroad construction should not impact this experiment. The proposed alignment would have little effect on other experiments in the Hill Pasture because these experiments have been or will be completed by the time the rail line is constructed.

The Hogback Unit supports several experiments which concern the relationship between grazing, forage production, and cultural treatments of rangeland. The rangeland vegetation has been mapped in detail and the reciprocal relationships of range production on livestock growth and vigor and the influence of livestock grazing on vegetation have been documented over a 50-year period. The loss of 10

acres of grazing land to the railroad right-of-way would reduce the carrying capacity of Hogback slightly and may alter grazing patterns. However, because the proposed alignment is proximate to the existing eastern boundary of the Hogback Unit, the influence of the railroad in altering grazing patterns would be lessened. The impacts of the proposed rail line on the detailed vegetation mapping of the Hogback Unit would be minimal.

Construction of the Moon Creek alternative route would impact the LARRS to a lesser extent than would the proposed rail line or the Tongue River Road route. This route would traverse approximately 2.35 miles of the LARRS. The land taken for the Moon Creek route is considered less valuable for research because it is relatively abundant on the station. The Moon Creek route would have no impact to vegetation research areas and would only take land from two pastures, the Moon Creek and Sadie Flats pastures. The pastures affected by the Moon Creek route are used primarily in conjunction with livestock research projects.

Construction of the Colstrip route would not require land from the LARRS.

Special use areas (e.g., subdivisions and recreation areas) would be affected by the proposed rail line and by the possible alternatives to it. The proposed rail line and the Tongue River Road route would intersect parts of the Branum Lake Fishing Access Site. In addition, the proposed rail line and each of the alternatives would cross the Tranel Subdivision near Ashland. None of the 13 residents currently established in this subdivision would be displaced. The Tongue River Road route differs from the proposed rail line and other alternatives in that it would cross the Tongue River Estates Subdivision. None of the houses in that subdivision would be displaced.

Construction of the proposed rail line or any of its alternatives would not conflict with established land use plans for the region.

Facilities Areas

The TRRC proposes to rehabilitate and to use the abandoned Chicago, Milwaukee, St. Paul and Pacific (Milwaukee Road) railroad facility at Miles City as an interchange yard. The rehabilitation of this facility would not require new land or change the current land use at this site. Should these yards not be available to the TRRC, the construction of a new facility would be necessary. Possible locations for this facility exist approximately 4 miles east of Miles City or southwest of that community near the BN tracks. The new yard would require the purchase of approximately 60 acres of land currently used for agricultural purposes.

In addition to the Miles City interchange facility, the TRRC would require a maintenance-of-way/signal-and-communication shop at Ashland.

This facility would be located on a 2-acre site in Ashland and should not affect current land use.

Acquisition of Borrow Sites

Much of the sub-ballast material required for the railroad grade would be extracted from cuts, especially from a deep, 170-foot cut located south of Ashland on the Ashland SE Alignment. However, the rail line from Miles City to a point 20 miles south of Miles City would require imported sub-ballast. Approximately 90,000 cubic yards of sub-ballast would be obtained from existing borrow pits within the Yellowstone River Valley. Additional sub-ballast material also would be required if the Ashland NW Alignment were used, because the large cut near Ashland would be eliminated.

Three or four new borrow pits, each 5 acres in size, may be required to obtain the additional, necessary sub-ballast material. Since the sites of these borrow pits have not been identified yet, the uses of the land on which they would be located currently are not known. These lands would be impacted in the short term, during extraction. Long term impacts would be negligible, since the borrow pits would be reclaimed.

Ballast material also would require importation from outside the project area, probably from existing borrow pits either in northern Wyoming or in South Dakota. This would have no effect on current land use in the project area.

4.1.1.2 Severed Properties

The construction of the proposed TRRC rail line would sever land parcels owned by public agencies and by private individuals. Most of the severed land currently is used for agriculture. A parcel-by-parcel examination of each possible route revealed that 1,083 acres would be lost to severance by the proposed rail line, 647 acres by the Tongue River Road route, 1,152 acres by the Moon Creek route, and 582 acres by the Colstrip route. If the Ashland NW Alignment is considered, 144 fewer acres would be lost to severance. Most of the land lost along these routes is used for grazing livestock at this time. The proposed rail line and the Tongue River Road route would sever approximately the same number of irrigated acres, while the Moon Creek route would sever somewhat less irrigated land, and the Colstrip route would sever substantially less.

The severance of land parcels should not affect appreciably the ability of ranchers to herd cattle between pastures along any of the projected routes. Research reveals that, if the appropriate cattle passes are constructed, most livestock would not be reluctant to trail through them. Cattle passes that are used infrequently may present

more problems to ranchers herding livestock. Should such a problem develop, the construction of holding pens on either side of a cattle pass would help to mitigate it.

The severance of land parcels also could limit ranchers' access to portions of their property. By locating crossings at the rail line's intersection with public and private roads, however, access restrictions would be minimized. In a few cases, either along the proposed route or along the alternative routes, rail line construction would require road relocation. In only one case would this relocation affect ranchers' travel time between the severed parcels of a ranch. The TRRC has agreed to undertake the necessary road relocation and construction of crossings in consultation with the affected land-owners.

The construction of the proposed rail line or the Tongue River Road route would sever parcels of land in a number of research pastures on the Livestock and Range Research Station near Miles City. Portions of a winter-calving pasture near Interstate 94, the Hill Pasture, Lower Flood, Tongue River Bend, 2-C Bend, and No. 3 pastures would be affected by the project.

The construction of the rail line would restrict the movement of equipment and livestock between pastures. In addition, it would displace a road providing access to the Lower Flood Pasture. The rail line also would disrupt access to wells currently used to water livestock, and to at least one water pipeline. Finally, the construction of the rail line through the Flood Pasture would disrupt operation of a dike system in that pasture.

The Tongue River Railroad Company has agreed to construct at-grade crossings and grade-separated crossings in sufficient numbers to allow vehicles and livestock to reach the various affected pastures. The TRRC also has agreed to relocate a road east of the rail line in the Lower Flood Pasture, thereby providing sufficient access to that area. Finally, the TRRC has agreed to install new wells, to replace the disrupted pipeline in the various affected pastures, and to install culverts in the Lower Flood Pasture in sufficient numbers to allow the passage of water.

A rail line along the Moon Creek route would disrupt access in the Moon Creek and Sadie Flats pastures. The construction of appropriate crossings would be necessary. The Colstrip alternative route would not cross the LARRS.

The proposed rail line and any of its alternative routes would cross the Tranel Subdivision, located north of Ashland. The Tongue River Road route also would sever the Tongue River Estates Subdivision. A number of tracts would be severed by the rail line and could be rendered unusable. However, since most tract boundaries could be readjusted, it is assumed that there would be no parcel loss of subdivision land due to severance. The exception to this assumption

would be in the case of the Ashland NW Alignment, where two tracts are severed twice by the proposed rail line. In this instance, portions of those tracts would be lost to subdivision use.

The proposed rail line and the Tongue River Road route would cross portions of Branum Lake Fishing Access Site. The Branum Lake site is not currently used for recreational purposes and no land would be lost to severance. The proposed rail line and the Tongue River Road alternative route would intersect the Miles City Livestock Sales Yard and would sever that area. Portions of the yard would be rendered unusable as a result of severance.

Construction of the rail line with the Ashland NW Alignment would sever parcels of urban land in that community. One trailer court and one industrial site would be severed by the rail line and would have to be relocated. A sawmill plant site would be severed. However, with the relocation of one office building, the site's function would not be impaired. Access to one trailer court in Ashland would be disrupted by the rail line with the NW Alignment. The establishment of a new access road to the court, which the TRRC would construct, would mitigate impacts to the trailer court.

4.1.1.3 Effect on Agricultural Productivity

The potential loss of agricultural productivity would differ among the alternative routes. The possible production loss is directly related to the impacts on irrigable cropland. Whereas the proposed rail line requires the conversion of fewer irrigable acres for the right-of-way than do either the Tongue River Road or the Moon Creek routes, the proposed rail line would potentially affect 10 existing mechanical irrigation systems and planned systems and could result in a loss of 415 additional acres of irrigable land. As noted, this assessment assumes that the land could not be returned to irrigable status by instituting an alternative system. Thus, the potential disruption of 415 acres is a "worst-case" figure.

In monetary terms, the agriculture production analysis indicates that \$3.4 million may be lost because of the proposed railroad during the analysis period, \$1.8 million because of the Tongue River Road route, \$3.5 million because of the Moon Creek route, and \$761,000 because of the Colstrip route.

4.1.2 Operation and Maintenance

The operation and the maintenance of the TRRC railroad may affect land use in the study area principally by restricting access to property. Potential delays at crossings would be the same for the proposed rail line and for the Tongue River Road and Moon Creek alternative routes. In 2011, with 19 to 25 trains operating per day, the probability of delay would be 4 to 6 percent. The average duration of the delay would be 1.6 minutes. Due to the topography of the Colstrip

alternative route, trains would move more slowly along this line than those trains routed along the proposed rail line. The probability of delay on the former route would range from 5 to 7 percent, with an average of 1.8 minutes per delay.

Crossing delays at the USDA Livestock and Range Research Station would be slightly fewer than the overall railroad-caused delays. The probability of delay would be 4.5 percent in 2011, with an average length of delay of 1.5 minutes. Delay problems at crossings near the Spotted Eagle Lake Recreation Area and at the Tranel, the Trussler, and the Tongue River Estates Subdivisions would be small. The probability of delay at these sites generally would be 4 percent by 2011.

Other impacts associated with the operation and the maintenance of the proposed railroad or its alternatives (i.e., fire and coal dust) are expected to be minimal. However, a possible impact to the LARRS nursery site could result from the location of the proposed rail line or the Tongue River Road route approximately 150 feet east of the nursery boundary. With a 30-foot embankment, it could be expected that increased snow would accumulate within 450 feet upwind of the fill. Other microclimatological changes, such as reduced wind speed, evapotranspiration, and dessication, also could be expected to occur within 450 feet of the barrier. Snow accumulation due to the 30-foot embankment could be mitigated by judicious placement of snow fences upwind from the nursery site. The effects of reduced wind speed and evapotranspiration would remain. The potential impact to the nursery site would not occur with construction of either the Moon Creek or Colstrip routes.

4.1.3 Downline Operations

By 2011, traffic on most rail lines downline from the Miles City area would require additional sidings and double-track mainline installation. These needs would develop on an estimated eight downline corridor segments. However, the right-of-way's width on all of these segments is sufficient to accommodate the necessary expansion. Therefore, the implementation of the proposed railroad would not alter the existing land use in downline communities. The same would be true for the Tongue River Road and Moon Creek alternative routes.

The construction of the Colstrip alternative route might require additional facilities and acreage to accommodate an interchange yard at Colstrip.

4.1.4 Related Actions

The land use requirements for activities related to the TRRC railroad are functions of the acreage required for mining and of the land required for community growth.

4.1.4.1 Land Required for Mines

The TRRC railroad would serve an estimated five coal mines in the Ashland/Otter Creek area. Under the medium coal production schedule, these mines would remove an estimated 104,618 acre-years of agricultural production. Under the low coal production scenario, the loss would be 92,588 acre-years, and under the high coal production scenario, the loss would reach 147,158 acre-years. The reduction in agricultural productivity would be \$1.4 million under the medium coal production scenario. Since all of the possible rail line routes would serve the same mines, these production loss figures do not vary by alternative alignment.

4.1.4.2 Land Required for Community Growth

The construction of the TRRC railroad and the associated development of the related mines may add an estimated 6,100 people to the project area by 2010. These persons would require land for an expansion in housing, in public facilities, and in commercial and industrial sites. Under the medium coal production scenario, this impact may result in a loss of 12,910 acre-years of production. This figure would be 11,000 acre-years under the low coal production scenario and 16,550 acre-years under the high coal production scenario. The monetary value of this loss would be \$235,000 under the medium coal production scenario, \$200,000 under the low scenario, and \$293,000 under the high coal production scenario. The figures for lost agricultural production apply to all of the possible rail lines under study.

4.1.5 Overall Impact

The various routes of the Tongue River Railroad would affect 1,692 to 3,400 acres of land, much of which is currently being used as grazing land. Of the 30 to 59 total landowners affected by the various routes, the vast majority are involved in agriculture. Most agricultural producers would lose less than 10 percent of their deeded land, although three producers, all of whom are located along the Tongue River Road route, would lose more than 15 percent of their land. Representing the worst cases of impact and applicable only to specific routes are the following impacts: (1) the loss of 49 acres of prime farmland (the Tongue River Road Alternative); and (2) potential impacts to 10 irrigation systems (the Proposed Action).

The loss of agricultural productivity would vary by route, measuring from \$761,000 for the Colstrip route to \$3.5 million for the proposed rail line and the Moon Creek route. The railroad also would affect subdivision land (the Tranel and Tongue River Estates) and recreation land (Branum Lake Recreation Site). The lands impacted would vary by route. Limited access and delay problems at crossings are additional land use impacts of the Tongue River Railroad that would affect ranchers, recreation users, and residents of subdivisions. To mitigate problems, private roads could be relocated, and

crossings should be located at the rail line's intersections with public and private roads.

The coal mines would temporarily remove agricultural land from use, translating into a loss of \$1,635,000. The figures would vary by coal production scenario.

4.2 SOCIAL AND ECONOMIC IMPACTS

4.2.1 Construction

A railroad would not be constructed under the "No Action" Alternative and thus there would be no railroad-associated employment or impact to the local economy.

4.2.1.1 Employment

The construction of the Tongue River Railroad Company's proposed rail line would begin in 1985 and continue into 1989. The construction season would be limited to 7 months, generally excluding the winter months. The total work force on the project would fluctuate between 50 and 570 for the proposed rail line, the Tongue River Road and Moon Creek routes, and between 43 and 358 for the Colstrip Alternative. Forty percent of the anticipated construction work force likely will derive from the local area. The remaining 60 percent would be comprised of nonlocal workers.

4.2.1.2 Impacts to the Local Economy

The expenditures for construction salaries, materials, and services would affect the project area's economy. Under the Proposed Action, the Tongue River Road Alternative, and the Moon Creek Alternative, construction salaries are expected to total more than \$28 million during the 5-year period (1985-1989). The expenditures for materials would approach \$124 million. Labor and material costs for the Colstrip Alternative would be approximately 35 percent lower.

The influx of a large number of construction workers could create temporary economic dislocation--i.e., shortages of goods and services, inflation, etc. These problems might occur, but they are not expected to be either long term or severe. The area-wide economy readily could adjust to the construction project. Problems may arise, however, in smaller communities--such as Ashland--that cannot easily absorb economic change. The increased demand for local labor, caused by the railroad construction, also could affect the farm labor supply.

The construction of the proposed rail line would increase tax revenues in Custer County, Powder River County, and Rosebud County. This increase would be accompanied by a greater demand for services. However, the TRRC plans to reduce the potential service demands by encouraging workers to live in Miles City, a community that could

absorb population more easily than could smaller towns such as Ashland; and by establishing temporary construction camps. During the construction period, some jurisdictions will experience revenue surpluses, and other jurisdictions will experience net deficits. The reason for the deficits is that these latter jurisdictions would experience impact population, but would not accrue TRRC tax payments. On a county by county basis, only Powder River County would experience a net fiscal deficit for the entire construction period. The three county area would experience a revenue surplus for the period in excess of \$8 million.

TABLE 4-2

SUMMARY OF SOCIAL AND ECONOMIC IMPACTS
RAILROAD AND RELATED ACTIONS

	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE	"NO ACTION" ALTERNATIVE
(1) TOTAL OPERATION AND MAINTENANCE EMPLOYMENT (2010)					
Direct and Indirect	533	533	533	487	-0-
(2) IMPACT POPULATION IN SELECTED JURISDICTIONS (Medium Scenario, 2010)					
Custer County	1,094	1,094	1,094	261	-0-
Miles City	991	991	991	236	-0-
Powder River County	2,220	2,220	2,220	2,220	-0-
Rosebud County	2,791	2,791	2,791	3,305	-0-
Colstrip	1,165	1,165	1,165	1,433	-0-
Forsyth	689	689	689	960	-0-
(3) TOTAL AREA POPULATION (Medium Scenario, 2010)					
	33,734	33,734	33,734	33,734	27,629
(4) TOTAL AREA IMPACT POPULATION (Medium Scenario, 2010)					
	6,105	6,105	6,105	5,786	-0-
(5) CUMULATIVE NET FISCAL BALANCE ^a (\$000) (1984-2010)					
Custer County	\$ 43,027	\$ 43,027	\$ 43,027	\$ (1,867)	\$-0-
Powder River County	8,664	8,664	8,664	8,664	-0-
Rosebud County	146,757	146,757	146,757	151,326	-0-
TOTAL	\$198,448	\$198,448	\$198,448	\$158,123	\$-0-

^a All jurisdictions, by county

On an area-wide basis, the nonlocal construction workers are unlikely to alter the social environment significantly. Some problems, however, may arise in smaller communities, such as Ashland. For

example, the short term influx of a relatively large number of transient workers into these smaller communities could increase crime, alcohol abuse, and conflicts between the local residents and the non-local workers.

4.2.1.3 Impacts to the Northern Cheyenne Indian Reservation

The construction of the proposed railroad would result in very little, if any, impact on the social and economic life on the Northern Cheyenne Indian Reservation. The majority of the construction work force (60 percent) would be transient workers, living off the reservation either in facilities provided by the Tongue River Railroad Company or in Miles City.

The percentage of the construction force drawn from local areas (40 percent) could include workers from the Northern Cheyenne Indian Reservation. The construction of the proposed rail line thus could reduce the unemployment rate on the reservation to some extent. Since the Northern Cheyenne workers probably would reside on the reservation, some temporary impact to the reservation's economy as a result of their income expenditure could occur.

4.2.2 Operation and Maintenance

4.2.2.1 Employment

The number of jobs created directly or indirectly by the operation and the maintenance of the proposed rail line depends upon the amount of coal produced and transported. Under the medium coal production scenario, 533 jobs would be created by 2010. This number would not differ under the Tongue River Road Alternative or the Moon Creek Alternative, but the total would be slightly lower (487) under the Colstrip Alternative. The "No Action" Alternative would result in no TRRC-associated employment.

4.2.2.2 Impacts to the Local Economy

Under the Proposed Action, the Tongue River Road Alternative, and the Moon Creek Alternative, most railroad-operating personnel would reside in Miles City. The resultant demand for services and other sociological impacts would be concentrated primarily in that area and are not expected to be significant. Under the Colstrip Alternative, the operating personnel would reside in Colstrip. The impact for this small number of people, in 2010, also is not expected to be significant. It is likely that a number of TRRC employees will be members of the Northern Cheyenne Indian Tribe, residing on the reservation.

The possible adverse impact on the area's tax base would be negligible and would be repeatedly offset by the increased tax revenues associated with the rail line. The question of whether land adjacent to the rail line would experience devaluation remains unresolved. The loss of land for ranching, the restriction of the use of land, and

those management problems and inconveniences associated with a rail line generally could render a ranch property less attractive. When interviewed, most ranchers who own property adjacent to rail lines have stated that the rail line did exert an adverse effect on local property values. However, this statement was not substantiated by their own experience. They have witnessed little, if any, detrimental effect on their own property values. Isolated property cases that clearly would be affected adversely include subdivisions and those areas in Miles City adjacent to the abandoned Milwaukee Road line. However, the demand for community development that would be associated with coal mining most probably would cause an overall increase in land values within subdivisions.

4.2.3 Downline Impacts

The construction and the operation of either the proposed railroad or its alternatives would not affect significantly downline social and economic patterns.

4.2.4 Related Actions

The construction of the proposed railroad will likely foster the development of coal mines in the Tongue River region. The operation of the railroad and the construction and operation of five possible mines in the TRRC service area would change the economic, demographic, and social character of the project area.

4.2.4.1 Population and Employment

Population forecasts for the three-county region (i.e., Custer, Powder River, and Rosebud Counties) suggest that, without the TRRC railroad and the related mines (the "No Action" Alternative), very little change will exist in the total population after the construction of Colstrip Units 3 and 4 is completed in 1986. Region-wide, the 2010 population would increase only 2 percent above the 1980 level. The population shifts at the county level would be more pronounced. Powder River County and Custer County populations are expected to decrease steadily between 1980 and 2010. Yet, Rosebud County's population is forecast to grow to an extent offsetting the net decreases in the other two counties.

The distribution of population among communities within the project area is expected to change somewhat as a result of the variable growth rates among counties. Without the proposed railroad and the related mines, Miles City would remain the dominant center, holding over 40 percent of the project area population. In 2010, the overall distribution of population, by community, would differ from the 1980 distribution by 2 or 3 percent.

The baseline forecast suggests that fundamental employment in the project area would be lower in 2010 than it was in 1980. A gradual aging of the population would occur, due to the outmigration of

younger people seeking employment. However, the structure of the area's economy would change little, as most sectors would grow modestly. The agricultural sector would demonstrate an exception to this trend, since it is expected to continue its historical decline, reducing 18 percent by 2010.

The construction of the TRRC railroad and the related mines would increase the project area population to a total of 6,105 people by 2010, under the medium coal production scenario. This figure would increase to 7,489 under the high production scenario, and decline to 5,026 under the low production scenario. During the intermediate years of the railroad and mine operations, the area population would vary from the 2010 figure, with the largest fluctuations occurring during the years of mine construction.

All of the project area counties would grow in population as a result of the construction of the TRRC railroad and the related mines. Rosebud County would experience the greatest share of the impact population (46 percent), followed by Powder River County (36 percent) and Custer County (18 percent).

A significant percentage of the impact population would locate in Colstrip, Forsyth, and Miles City. However, the growth rates for these communities would not be remarkable. Colstrip would not approach its projected 1983 population of 7,826--the construction peak for Colstrip Units 3 and 4--at any time during the analysis period (1984-2010). Forsyth would not regain its 1983 population level of 3,564 until 1999. In Miles City, the incremental population growth would not exceed 5 percent over the 27-year period.

The communities of Ashland and Broadus are forecast to experience the greatest population growth. By 2010, Ashland's population under the medium coal production scenario, would be 137 percent higher than its projected 1983 population of 1,495. The population of Ashland would be 186 percent higher under the high coal production scenario. Broadus similarly would increase its 1983 population of 731 by 107 to 133 percent, depending upon the level of coal production.

Additional fundamental employment would be created by the construction of the proposed railroad and of the related mines. Under the baseline forecast, the project area is expected to experience a stable economy. The effect of the railroad and the mines would be to alter this static economy to an economy of overall, steady growth. Most employment sectors would continue to grow. The decline of the agricultural sector would persist, and the mining sector soon would overtake it as the dominant employment sector in the region. Overall, employment in the area would increase by almost 3,000 jobs, an increase of 25 percent above the baseline projection.

The population and employment trends predicted for the Tongue River Road and the Moon Creek alternative routes are the same as those trends for the proposed railroad. For the Colstrip route, however,

the impact population would be slightly lower: 5,786 persons. Also under this alternative, population growth rates would be larger in Colstrip and in Forsyth and lower in Miles City. Still, given the Colstrip alignment, the overall employment trends for the project area would differ little from those forecast for the proposed TRRC railroad.

4.2.4.2 Demand for Services

Under the "No Action" Alternative, or baseline forecast, there would be a small increase in the demand for services. With the proposed and related actions or the alternative actions, there would be a substantially greater demand for local services, principally in terms of housing and public facilities.

During the analysis period (1984-2010), a growing demand would exist for single-family dwellings, as well as for mobile homes. The demand would fluctuate briefly from 1984 to 1986, because of the completion of construction at Colstrip Units 3 and 4. After that period, the demand would rise steadily until it reached 2,167 units by 2010. This projection prompts the expectation that a long term market for housing will exist. Given the availability of contractors in the project area, an orderly development of housing would be feasible.

The communities of Colstrip, Forsyth, and Miles City might experience temporary housing problems. However, these difficulties would be of short duration. Ashland and Broadus may experience much greater housing problems, because of the large population increases expected in those two communities. Careful planning would be needed to provide the required housing in an orderly manner.

The demand for housing would not differ for the proposed railroad, the Tongue River Road Alternative, and the Moon Creek Alternative. For the Colstrip route, the populations of Colstrip and Forsyth would increase more than for the proposed railroad. Greater short term housing impacts therefore might occur in these two communities.

The increase in the project area population would not be sufficient, relative to the baseline situation, to require an inordinate demand for expanded public facilities. Under the medium coal production scenario, most counties would need to expand schools, to add one or two fire and/or police vehicles, and to establish new parks and recreation areas. A region-wide demand for approximately 25 hospital beds also would develop.

Ashland would receive the greatest comparative demand for public facilities. The community would require the expansion of its elementary school by 1986 and an increased capacity for its water treatment facility.

The differences in facility needs among the low, the medium, and the high coal production scenarios essentially are related to the tim-

ing and the magnitude of impacts. Facilities designated for expansion under the medium coal production scenario also would require expansion under the low scenario--excluding the water system in Broadus, which could serve the total demand population. Under the high coal production scenario, most facilities would require a 25-percent additional capacity.

Facility expansion requirements for the Colstrip Alternative would be basically the same as those requirements for the proposed railroad. The major facility needs in Rosebud County would not vary by route. Only those facilities projected strictly as a function of the size of the impact population--e.g., equipment and vehicles--would differ. For the Colstrip route, these additional facilities would be approximately 25 percent higher than for the proposed TRRC railroad.

For the Colstrip alternative route, Custer County and Miles City would exhibit significantly lower facility requirements than they would with the proposed railroad, because of the relative decrease in their estimated impact populations. These impact populations are estimated to be sufficiently reduced to eliminate the requirement for additional police and fire vehicles. Their other facilities needs are approximately two-thirds less than the levels associated with the proposed railroad's impact population.

4.2.4.3 Fiscal Impacts

Without the construction of the TRRC or the related mines, industrial revenues to local governments would decline. While the facility expansion requirements would also be much reduced under the "No Action" Alternative, it is likely that revenue needs would require additional tax dollars. These revenues would likely derive from non-mining industry sources, and per capita tax rates might rise in local counties.

The fiscal impact analysis of the proposed and alternative actions focuses on the net fiscal balance that results from subtracting those governmental costs associated with the proposed railroad and with the related mines from those revenues accrued to various jurisdictions. For ease of analysis, the assessment is presented in terms of revenue surpluses and deficits. Since jurisdictions are prohibited from showing either a surplus or deficit, it is assumed that these conditions would result in either a tax decrease or increase. Local government operation, maintenance, and capital improvement costs are expected to total more than \$50 million through 2010. State expenditure requirements are forecast to increase between \$1 million and \$9 million annually as a result of the TRRC railroad and the mines. In addition, state highway maintenance and highway construction costs may increase by \$14 million in the project area.

At the state level, tax revenues from the TRRC and from the five surface coal mines would more than offset these added costs. By 1991,

a net fiscal surplus of \$12.7 million would result. This surplus would rise to \$80 million by 2010. A cumulative surplus of \$1,078 million might accrue to the state by 2010.

At the county level, Custer and Rosebud Counties would experience net fiscal deficits, beginning during the first few years of railroad construction. By 1987, these jurisdictions would not be suffering from fiscal deficits. Powder River County would experience net fiscal deficits through the early 1990s. After the opening of the projected mines in that county, however, net surpluses would begin to accrue. Through the entire 27-year period (1984-2010), Powder River County would accrue a surplus of approximately \$16 million. These surpluses would be reflected in a decrease in per capita tax burden for the affected areas.

The construction of the TRRC railroad and the mines may cause an average, annual revenue shortfall of \$84 per capita between 1984 and 1991 in Powder River County. However, when these deficits are combined with the surpluses from oil and gas revenues in Powder River County, the shortfall is eliminated. During the analysis period, as oil and gas production decreases in the county, mining revenues would replace the declining oil and gas receipts, and these revenues would contribute to continued net fiscal surpluses in the county.

Fiscal projections associated with the impact population differ among Broadus, Forsyth, and Miles City. Broadus would experience net fiscal deficits throughout the analysis period (1984-2010), requiring an annual, average, per capita tax increase of less than \$19. Forsyth, after experiencing revenue shortfalls during the first few years, would receive additional revenues to equal its additional costs. In most years, Miles City would receive property tax payments from the TRRC that would exceed its impact costs.

The Broadus Elementary School, the Colstrip Elementary School, the Forsyth Elementary School, and the Forsyth High School are projected to experience consistent net fiscal deficits through the analysis period. The average, annual per capita deficits are estimated as:

- (1) Broadus Elementary School--\$234.00
- (2) Colstrip Elementary School--\$32.00
- (3) Forsyth Elementary School--\$24.00
- (4) Forsyth High School--\$19.00

The Ashland Elementary School, the Colstrip High School, and the Powder River High School also would experience some years of deficits. Considering the entire analysis period, however, they would experience fiscal surpluses. In the following school districts, revenues are projected to exceed costs by varying amounts, given in millions of 1981 dollars:

- (1) Ashland Elementary School--\$64
- (2) Custer County High School--\$16

- (3) Birney Elementary School--\$21
- (4) Colstrip High School--\$4
- (5) Miles City Elementary School--\$3
- (6) Powder River High School--\$1

From a public fiscal perspective, the residents of Miles City and Custer County would benefit overall from the TRRC railroad and from the related mines, as would the residents of Rosebud County. The residents of Powder River County, and particularly the residents of Broadus, would experience the largest adverse fiscal impact. Broadus residents may encounter a \$265 annual per capita increase in their tax liabilities for city government and school district services. This impact occurs because a significant portion of the impact population is assumed to locate in Broadus, but Broadus would not benefit directly from either the railroad company's or the mining companies' property tax payments. In the long term, however, Powder River County residents would benefit from a large fiscal surplus.

The relative patterns of net fiscal impact, by jurisdiction, under the high and low coal production scenarios would reflect the same characteristics as those patterns projected for the medium scenario. With the exception of the first strip mine, the timing of the mine openings and the annual volume of coal produced would vary by scenario. Thus, the resultant corporate property and business tax revenues also would vary. The different production schedules primarily would affect the net fiscal impact experienced by taxing jurisdictions in Powder River County. Under the high coal production scenario, the cashflow problems of the Powder River County jurisdictions would be eliminated 5 years earlier than they would be under the medium scenario. Under the low coal production scenario, cashflow problems would be eliminated 1 year later than under the medium scenario.

The imbalance among jurisdictions regarding net fiscal balances suggests that a primary means to mitigate the adverse fiscal impacts would be to establish a procedure for sharing revenues within county jurisdictions. The functions of such a procedure would be: (1) to mitigate, through the subject period, the imbalance of revenues and costs among jurisdictions; and (2) to redistribute the large surpluses experienced by some jurisdictions to those jurisdictions projected to incur deficits. For example, part of Rosebud County's surpluses could be transferred to Forsyth to eliminate its projected cashflow problems. Less than 0.5 percent of the county's cumulative excess revenues would be required for this use. By means of such revenue-sharing procedures, the combined school jurisdictions in Rosebud County would attain greater income than costs for every year of the analysis period. Another measure to mitigate the adverse fiscal impacts is the disbursement of state revenues, such as coal severance tax revenues, that are designed to assist those areas experiencing energy development.

The Tongue River Road or Moon Creek alternative routes, coupled with the related mines, would produce the same fiscal impacts as those

impacts caused by the proposed railroad and the mines. The use of the Colstrip route, however, would generate less cumulative surpluses for Miles City and Custer County. Under the Colstrip alignment, income to Rosebud County and to the Colstrip school districts would increase substantially. Forsyth and its school districts, however, would not share in rail revenues, yet they would experience an increased impact population. As a result, the negative fiscal impact projected for Forsyth and for the Forsyth school districts would be 50 to 60 percent greater with the Colstrip route than with the proposed railroad. The fiscal balance of the other jurisdictions in the project area would be unaffected by the Colstrip route. That is, the fiscal balance projected for the proposed railroad and mines would prevail.

4.2.4.4 Sociological Impacts

Under the "No Action" Alternative, communities in Custer, Powder River, and Rosebud Counties would not grow dramatically. Sociological impacts associated with energy development in the Ashland/Birney/Otter Creek area therefore would not occur.

The increase in population that would accompany the development of the TRRC railroad and the mines could result in impacts to the project area's communities and to the lifestyle of area residents. These effects are difficult to measure and to predict, but may be ascertained by observing communities that have experienced rapid growth--"boom-town" communities--and by considering the concern of the area's residents that their way of life would change.

With the advent of coal development in the western United States, many small, rural communities have been confronted not only with providing services to increased populations but also with changes in their basic identity or character and in the way of life of their longtime residents. The impact populations, comprised primarily of transient workers and their families, maintain different values and lifestyles than do the established residents who, until the newcomers' arrival, enjoyed a life of relative privacy and isolation. The longtime residents must not only learn to live with people different from themselves, but may also be forced to adapt their own lifestyles.

The arrival of additional people may require residents to abandon their former interests and activities. If the newcomers are more numerous and become the major political component of a community, they could become the ranking decision makers, determining the community's future development. The established residents then may find that they are outsiders in a community of which they once had served as an integral part and that the community itself has become unfamiliar. Respondents to a DSL survey addressing the Montco Mine development expressed similar concerns that coal mining would result in a population influx, in a loss of privacy, in a change in lifestyle, and in diminished recreational enjoyment.

Recreational opportunities and facilities in the area may be affected by increased population in several ways. Developed campgrounds, picnic grounds, and river access points may be subjected to increased misuse and vandalism in addition to possible crowding during high use periods. The quality of solitude, considered an important aspect of outdoor recreation, may be somewhat diminished. Increased pressure on fish and wildlife populations may influence hunting and fishing success. Resentment may develop on the part of longtime residents towards the perceived insensitivity of the newcomers toward their natural surroundings.

Established residents also have expressed concern that the population influx would precipitate greater social problems. Increased crime, juvenile delinquency, trespassing, family disputes, marital stress, spouse and child abuse, mental stress, and alcohol and drug abuse are all major concerns.

A population increase of 22 percent is expected in the three county area for the analysis period. This translates into an annual compound growth rate of 0.7 percent, considerably below the project area growth rate from 1970 to 1980, and about equal to the growth experienced in Custer County since 1970. As a result, the impact of rapid growth would be less significant on an area-wide basis than they would be to the individual communities.

The impacts to local communities from this population increase will vary. Only Miles City would not sustain population increases of 10 percent or more in any given year. Colstrip and Forsyth would experience such increases prior to 1987 as a result of construction of Colstrip Units 3 and 4. Colstrip would again approach or reach the 10-percent growth level in 1998 and 1999. Broadus, Ashland, and Birney would experience such levels of growth at various times during the analysis period. These communities would be especially susceptible to the impacts commonly associated with the "boomtown" phenomenon.

Colstrip and Forsyth currently hold the resources that would allow them to plan for and manage the projected population growth without experiencing severe sociological problems, particularly in comparison to Ashland and Broadus. The impact population generated by the Tongue River region's coal development could be integrated more easily into Colstrip and Forsyth, which already have experienced coal development. Based upon the projections for 2010, Broadus will double its 1980 population. Impacts associated with rapid growth are unavoidable under such circumstances, but Broadus does have the social and institutional structure necessary to manage the growth in a manner that would avoid many of the potential impacts and would mitigate others.

By 2010, Ashland also will more than double its 1980 population, with an annual growth rate ranging from 3 to 4 percent. Ashland currently contains no formal group to meet the demands of an increased population and to coordinate plans with coal companies and state agencies. In addition, the community is comprised of many small social

groups that seldom interact, reducing the community's capacity to reach a consensus. The lack of institutions to handle growth and the lack of community cohesiveness would hamper Ashland's ability to absorb the predicted population increases.

The various sociological problems that can be generated by rapid population rises may confront Ashland. The community's established residents may experience a fundamental change in their lifestyle. They may find that their privacy has been violated, that their values conflict with the newcomers' values and interests, that their families are under stress, and that their community's political process has become more formal. In addition, the development of local coal mines may mean the removal of the community's economic determinism--particularly when land use and employment issues are decided by coal industry officials residing outside of the local area. Ashland would experience the growing presence of government as well. Further, social stratification within the community would be amplified when coal development increases the status of some residents while it decreases the status of other inhabitants. Women and the elderly would be the persons most affected, as mine workers predominantly are male and under 60 years of age.

Similarly, the community of Birney will experience impacts from population growth that it would be ill-equipped to deal with. The population of this small community would more than double at one time during the analysis period, and will remain nearly twice the current size in 2010. The only formal government structure in Birney is the local elementary school board. Current housing and community services are inadequate to deal with a rapid influx of population.

Although Birney, like Ashland, has no formal community structure to provide for planned development, it does have a community cohesiveness not evident in Ashland. This sense of community, combined with the smaller size of the existing population and proportionally smaller anticipated population influx, could be a positive factor in dealing with the anticipated impacts.

The sociological impacts experienced by the several area communities would vary under the different scenarios of coal production. Under the high coal production scenario, the population growth would be greater and commence earlier, potentially exacerbating the attendant social problems. A lesser impact would occur under the low coal production scenario.

Coal development would expand job opportunities within the project area's communities. The DSL survey, assessing local reactions to mining, showed that a few respondents considered the advantages of coal mining to include better community services, improved shopping opportunities, and greater job security.⁵ An overall increase in the local standard of living may occur, because personal income tends to increase with the development of coal. The population influx and personal income growth increase may produce a greater diversity of avail-

able goods and services in the area. Immigrants, with different interests and activities, also may prove beneficial to the communities, because their presence would combine with the increased personal incomes to expand the choice in lifestyles.

The project area communities that would be affected by coal development could mitigate some of the potential sociological impacts. This mitigation would result from coordinating their actions with the mining companies and the pertinent public agencies to ensure that their populations are provided the required services. Colstrip, Forsyth, and Broadus possess the ability, socially and institutionally, to manage the anticipated growth in their communities--although the problem of Broadus' net fiscal deficits between 1984 and 1993 would require solving. On the other hand, Ashland's response to mine development thus far has been limited to some individuals who have provided housing lots. That community's current informal political structure will not respond productively to a large influx of population. Ashland specifically needs to plan its response to coal development.

4.2.4.5 Impacts to the Northern Cheyenne Indian Reservation

Impacts of primary concern to members of the Northern Cheyenne Indian tribe are those associated with the construction and operation of coal mines developed because of the presence of the Tongue River Railroad. It is estimated, however, that the cumulative development of the proposed railroad and related mines would lead to a population increase on the Northern Cheyenne Indian Reservation of only 2 percent over the normally anticipated growth by the year 2010. This would result in a population of 3,702 persons by 2010.

Current estimates are that 15 percent of the work force of the mines will be Northern Cheyenne Indians living on the reservation. Additionally, some residents would be employed in off-reservation secondary development. This would cause a small decrease in the reservation's unemployment rate.

Conflict with non-Indians and among themselves could increase, because of the changing values and lifestyles of those employed at the mines. An increased reliance on a cash economy and increased exposure to other values indirectly could decrease the incidence of communal living, making the conveyance of Cheyenne customs and language more difficult.

Conflict also could arise with the proximity of non-Indian mine workers and from workers commuting across the reservation. Increased contact could result in more intermarriage and would intensify competition in social activities. More interaction with non-Indians might promote social problems within Indian families due to the concern for the deterioration of Northern Cheyenne culture. An additional concern of the Northern Cheyenne is that coal development would exacerbate

alcoholism and drug abuse, considered by the Northern Cheyenne as the most serious social problem on the reservation.

The magnitude of these impacts on the Northern Cheyenne is unknown. However, in the case of the Birney district, it is anticipated that impact brought about by the Montco Mine, without any mitigative measures, could seriously impact the sense of family and community cohesion that apparently has maintained and characterized the Birney district as traditionally Cheyenne.

Additionally, the use of the reservation's recreational resources might increase when mine workers settle near the reservation and commute across the reservation from Colstrip. Current recreational facilities are inadequate to meet the needs of area residents. Increased use would diminish the quality of recreational experience enjoyed by users of the tribal recreation areas.

4.2.5 Overall Impact

The "No Action" Alternative, or baseline forecast, would result in no TRRC or mine-related employment. Population in the Ashland/Birney/Otter Creek area would rise slightly by 2010, but would not significantly affect area communities. There would be some outmigration of working age persons. TRRC- and mine-related expenditures would not occur under the "No Action" Alternative and per capita tax payments might rise. Sociological impacts to area residents would not be likely to occur without the proposed railroad and the related mine development.

With the proposed railroad, employment in the area would increase. During the various periods of construction, the Tongue River Railroad would employ from 50 to 570 workers, 40 percent of which could be from the local work force. Varying by the route, 487 to 533 individuals would be employed, directly or indirectly, during the operation of the railroad. Most significant economic impacts and sociological impacts attributable to the railroad would be experienced by small communities like Ashland and Birney. The impacts of inflation and shortages of goods and services would be short term problems. The effect on the agricultural industry would include the impact of the increased demand for local labor on the farm labor supply and the potential devaluation of ranching properties. Net fiscal deficits would be experienced by some jurisdictions in some years. But area-wide net fiscal surpluses would be the rule.

The development of the TRRC railroad and the mines would change the economic, demographic, and social character of the project area. The economy would become one of overall, steady growth, with 3,000 employees in the mining sector. By 2010, the population would increase to between 5,026 and 7,489, depending upon the coal production of the area. Half of the people associated with the impact of the mines would reside in Rosebud County. The communities experiencing the greatest population growth and, in turn, the greatest demands for

housing and public services and the most sociological impacts would be Ashland, Broadus, and Birney. Additionally, Forsyth, Colstrip, and Miles City would experience temporary housing problems. Careful planning to provide the required housing in an orderly manner and to manage the growth in population would help to mitigate the impacts.

Most jurisdictions would incur net fiscal surpluses. However, Powder River County would experience net fiscal deficits until the mines are in operation. Broadus would have net fiscal deficits through the analysis period, and Forsyth would have deficits in the initial stages of coal development. Various school districts (Broadus Elementary School, Colstrip Elementary School, Forsyth Elementary School, and Forsyth High School) would experience net fiscal deficits.

4.3 TRANSPORTATION

The construction of the Tongue River Railroad Company's proposed rail line would affect project area transportation system by increasing the vehicle delays at crossings and by increasing the number of vehicles using project area highways. Under the "No Action" Alternative, there would be no vehicle delays from TRRC trains in the project area, and area traffic would likely decrease over the analysis period (1984-2011).

4.3.1 Construction

The TRRC plans to include a two-lane service road within the rail line right-of-way. The maximum use of this road to transport workers and materials to the construction sites would reduce the potential impact to project area highways and to highway traffic. During the construction period, highway system traffic volumes would increase primarily on the Tongue River Road and, to a lesser extent, on the road between Birney and Ashland (FAS 566).

Temporary traffic delays would be experienced by motorists at public road and private road crossings. The proposed rail line includes 14 public crossings, whereas the Tongue River Road alternative route involves 18, the Moon Creek alternative route involves 12, and the Colstrip alternative route, 11. Eight of these proposed rail line crossings, seven of the Tongue River Road crossings, seven of the Moon Creek crossings, and seven of the Colstrip crossings are grade-separated. Thus, traffic delays caused by construction would not occur at these crossings. At the remaining crossings, a provision that the TRRC maintain one vehicular traffic lane during all construction activities would ensure only minimal delays.

4.3.2 Operation and Maintenance

By the year 2011, 22 TRRC trains daily may use the proposed rail line, if the medium coal production scenario occurs. These trains would cause delays at unseparated rail/highway crossings. In 2011,

TABLE 4-3

SUMMARY TABLE OF TRANSPORTATION IMPACTS

	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE	"NO ACTION" ALTERNATIVE
(1) VEHICLE DELAYS DUE TO TRRC TRAINS (2011)					
Delayed Vehicles	2,370	2,370	2,370	1,956	--
% of Trips Delayed	2.0%	2.0%	2.0%	1.6%	--
(2) PERCENTAGE OF EMERGENCY CALLS DELAYED IN MILES CITY CAUSED BY TRRC TRAINS (2011) (Average Delay 4 minutes)					
Fire	2.5%	2.5%	2.5%	-0-	--
Medical	3.8%	3.8%	3.8%	-0-	--
(3) PERCENTAGE OF EMERGENCY CALLS DELAYED IN FORSYTH CAUSED BY TRRC TRAINS (2011) (Average Delay 4 minutes)					
Fire	5.3%	5.3%	5.3%	11.3%	--
Medical	6.7%	6.7%	6.7%	14.3%	--
(4) LARGEST PERCENTAGE OF ONE-WAY TRIP DELAYS DOWNLINE CAUSED BY TRRC TRAINS (2011, 11 communities) (Average Delay 1.3 to 1.7 minutes)					
	2.1-3%	2.1-3%	2.1-3%	2.1-3%	--
(5) PERCENTAGE OF RURAL VEHICLE DELAYS DOWNLINE (2011) (Average Delay 1.25 minutes)					
TRRC	1.5%	1.5%	1.5%	1.5%	5.1%
Total Trains	6.6%	6.6%	6.6%	6.6%	5.1%
(6) AVERAGE DAILY HIGHWAY TRAFFIC (ADHT) VOLUMES, BY HIGHWAY SEGMENT, ALL ALTERNATIVES					
	ADHT 1981	ADHT 2011	"NO ACTION" ALTERNATIVE		
FAP 39					
I-94 to Colstrip	1,200	1,630			780 ^a
Colstrip to Lame Deer	560	1,280			391 ^a
FAP 37					
Lame Deer to Ashland	940	2,910			1,100
Ashland to Otter Creek Road (FAS 484)	740	3,520			829
Otter Creek Road to Broadus	680	1,970			762

^a Based on 1979 traffic counts

TABLE 4-3. SUMMARY TABLE OF TRANSPORTATION IMPACTS (continued)

	ADHT 1981	ADHT 2011	"NO ACTION" ALTERNATIVE
FAP 23			
Miles City to Broadus	455	970	510
FAS 484			
U.S. 212 to Mines #2 and #3 (6 miles)	110	1,950	123
FAS 447			
Ashland to Mine Site #4 (14 miles)	195	825	218
FAS 566			
Ashland to Mine Site #1 (7 miles)	115	215	135
FAS 332			
FAP 23 to FAS 447	30	80	35
Unnumbered Road--Ashland to Mine #5 (3 miles)	n/a	700	n/a
South Fork Crow Creek Road	45	260	52

vehicles delayed by TRRC trains would number 2,370. About 2 percent of the trips undertaken across the railroad would be delayed by TRRC trains. Delays at crossings for the Tongue River Road route and the Moon Creek route would be the same as those delays for the proposed rail line.

If the Ashland NW Alignment is considered, there would be an increased probability of delay for the residents of Snodgrass Court, due to the elimination of one of two access routes from the Ashland community proper. However, the remaining access route would be sufficient to prevent the isolation of the residents from the rest of the community.

Vehicular delays would be slightly fewer for trains operating on the Colstrip route, measured in 2011 as 1,956 delayed vehicles. Forsyth and Miles City would experience the greatest number of delays and the highest percentage of delayed trips. On the Colstrip route, daily TRRC train movements within Miles City would be less than for the proposed railroad operation or its alternatives. With operation of the Colstrip alternative route, only eastbound trains would travel through Miles City. Thus, train volumes and, consequently, traffic delays, would be reduced in Miles City. Westbound and eastbound traffic from Colstrip would, most likely, operate from Forsyth, which would increase vehicle delays in that community.

Overall, fewer delays would be experienced in the project area if the Colstrip alternative route were selected. This variation in the percentage of delayed area-wide trips is not significantly different among the alternatives. The differences in the average duration of the delays per vehicle are minor.

The crossing delays would vary by coal production scenario. Under the high scenario, by 2011, the project area delays may be 15 percent higher than under the medium scenario. Under the low coal production scenario, the variation in delayed vehicles from the medium scenario is just the reverse of the high scenario. The expected duration per delay would not vary among the scenarios.

Rural traffic delays would be minimal--an average of 2.9 percent of the vehicular trips delayed in 2011, for the proposed railroad. Each delay would average 1.25 minutes. Trains operating on the Colstrip route would cause a higher average percentage of trips to be delayed, 3.6 percent, for an average duration of less than 1 minute.

Forsyth and Miles City would experience not only general vehicle delays, but also emergency service delays. In Forsyth, every emergency call requires at least one rail crossing for the ambulance service and the fire service volunteers to travel to their stations. One-third of the calls requires a second rail crossing. In Miles City, rail crossings are required only when the emergency is located north of the abandoned Milwaukee Road line. Approximately 15 percent of the city's medical emergencies and 20 percent of its fire emergencies occur north of that rail line. A fire department substation north of the tracks alleviates this situation except in cases where additional personnel and equipment are required for major fires. By 2011, with 22 TRRC trains operating per day, an average of 2.5 percent of the fire vehicles and 3.8 percent of the medical vehicles would be delayed in Miles City. The estimated delays for Forsyth would be 5.3 percent of the fire vehicles and 6.7 percent of the medical vehicles. The average delay would be 4 minutes for all vehicles.

Trains operating on the Tongue River Road and the Moon Creek routes would not differ from the proposed railroad in terms of delays. Trains on the Colstrip route would cause fewer delays to overall project area traffic. However, the delays in Forsyth would be significantly higher for this alternative route than for the proposed railroad. Approximately 11.3 percent of the community's fire vehicles and 14.3 percent of its medical vehicles may experience 4-minute delays. The cumulative delays for Miles City and Forsyth under the high coal production scenario and under the low coal production scenario would vary from the medium scenario by approximately ± 25 percent, respectively.

The consequences of crossing delays for fire emergencies include the increase of property losses. In regard to medical emergencies, the percentage of cases in which a delay would be critical for the

patient, or otherwise would precipitate a detrimental effect on the patient's condition, is small.

Area-wide delay statistics indicate that overall traffic in the project area would not be affected substantially by the TRRC trains. Traffic delays in the communities of Miles City and Forsyth, however, could be significant by 2011. The TRRC trains would not add appreciably to traffic delays in Miles City. Nevertheless, the combination of non-TRRC trains and TRRC trains would block one crossing of the Burlington Northern line for 9 percent of the average day in 1991. This figure would rise to 14 percent by 2011. A grade-separated crossing at this Miles City location would mitigate the problems of delays.

Forsyth would experience the greatest probability of delay. Non-TRRC and TRRC trains would increase from 9 percent to almost 19 percent by 2011. Given the total number of projected trains, Forsyth could experience serious traffic and service disruptions. Potential traffic delays in Miles City and Forsyth would not differ appreciably by alternative route.

The implementation of low cost actions, such as those measures discussed in section A3.1.2.3, and the installation of crossing-warning devices at nongrade-separated crossings would help to mitigate the problems in these two communities.

4.3.3 Downline Operations

Residents located downline from the proposed rail line would experience general vehicle and emergency vehicle delays as a result of the TRRC railroad. However, train traffic downline is expected to increase by 2011 even without the addition of the TRRC trains (the "No Action" Alternative). The TRRC trains would supplement only incrementally that expected increase.

The downline corridors for the TRRC-originated trains extend from Spokane, Washington, on the west, to Minneapolis/St. Paul and Duluth, Minnesota, on the east. The baseline ("No Action" Alternative) forecast for train traffic eastbound in 2011 is 33 trains; westbound traffic is estimated to be 30 trains. By 2011, these trains are projected to cause 5.1 percent of vehicle delays at rural crossings. The average delay would be 1.25 minutes. The communities of Fargo, North Dakota/Moorehead, Minnesota, and Spokane are experiencing significant rail/community conflicts. The increased train traffic under the "No Action" Alternative is likely to exacerbate this situation further. The 30 trains per day passing through Billings, Montana, in the year 2011 would create crossing delays near the central business district and could cause community development problems.

An analysis of selected communities within these corridors indicates that the TRRC-originated trains would delay no more than 3 percent of the general vehicle traffic by 2011. The expected delay would

range from 1.3 minutes to 1.7 minutes. Although the TRRC trains may inconvenience travelers, these delays would not be sufficiently significant to result in the isolation of neighborhoods or in new community development patterns. The percentage of vehicles delayed in these communities would be 18 percent lower under the low coal production scenario (19 trains per day) and 32 percent higher under the high scenario (25 trains per day).

The TRRC-caused delays to emergency vehicles in these downline communities would not be significant. By 2011, under the medium coal production scenario (22 trains per day), the TRRC trains would cause between 3 and 6 percent of the total delays. Under the high scenario, the percentage of delayed vehicles would be 32 percent higher, and under the low scenario that percentage would become 18 percent lower. Regardless of the year or the coal production scenario, the duration of delayed trips would range from 1.3 minutes to 1.7 minutes.

Rural areas in the downline corridors would experience even fewer traffic delays from the TRRC trains than would urban areas. The average percentage of delayed vehicles, by 2011, would be 1.5 percent, with the average delay lasting 1.25 minutes.

The large urban communities most likely to experience long term difficulties from the operation of the proposed railroad are Billings, Fargo/Moorhead, and Spokane. By 2011 the increased traffic in these communities would present railroad/community conflicts. However, the TRRC trains would not contribute appreciably to this expected traffic increase. Grade-crossing improvements and/or the installation of grade-separated crossings would help to mitigate these long term problems.

4.3.4 Related Actions

Under the baseline forecast ("No Action" Alternative), population is expected to increase modestly in communities in Rosebud, Custer, and Powder River Counties. Average daily highway traffic (ADHT) would likely increase slightly in proportion to changes in population. Therefore, by 2011, the following highway segments would show the greatest increase in traffic (17 percent): FAP 39; I-94 to Lame Deer; Colstrip to Lame Deer; FAP 37, Lame Deer to Ashland; FAS 566; FAS 332; South Fork Crow Creek Road. The increased traffic under the baseline forecast ("No Action" Alternative) would not be sufficient to warrant road improvements. However, normal use of the highways during the analysis period (1984-2011) would require road improvements and up-grading by the year 2011.

Growth in project area population associated with the proposed railroad and with the related mines would increase traffic volumes on area highways above the projected baseline change. New highways would not be needed to meet this expanded population. However, current highways might require such improvements as paving, widening, realigning, and structural enhancement. The type of improvements required

would depend upon the current highway condition and upon the increases in traffic.

The following highway segments would experience the largest traffic increases, as a result of the proposed railroad and of the related mines: FAP 39, Colstrip to Lame Deer; FAP 37, Lame Deer to Ashland and Ashland to Broadus; FAS 447, Ashland to Mine #4; FAS 484, U.S. 212, to Mines #2 and #3; FAS 566, Ashland to Mine #1; Unnumbered road, Ashland to Mine #5. As a result of the projected traffic volume increases, approximately 4.8 miles of primary highway in the project area might require improvement. The improvements would consist of road widening, road realigning, and structural enhancement. These activities would cost approximately \$2 million. Secondary-highway improvements in the project area would cost an estimated \$13.3 million. The related actions apply to all alternatives and thus the need for highway improvements would not differ among routes.

4.3.5 Overall Impact

During construction of the TRRC Railroad, only minimal vehicle delays would occur. The operation of the railroad would not substantially affect overall traffic, delaying from 2 to 3 percent of vehicular trips for no longer than 3 minutes. In rural areas, greater train operating speeds would cause vehicles to be delayed for approximately 1 minute. The figures vary by route, and additional variance would occur by coal production scenario. Urban areas would experience the greatest number of delays and the highest percentage of delayed trips. About 2.5 percent of fire service vehicle trips and 3.8 percent of medical service vehicle trips would be delayed in Miles City. Varying by route, 5.3 to 11.3 percent of fire service vehicle trips and 6.7 to 14.3 percent of medical service vehicle trips would be delayed in Forsyth. Traffic delays in Forsyth and Miles City, specifically, at a location involving both TRRC and non-TRRC trains, could be significant by 2011. The installation of crossing-warning devices and the construction of a grade-separated crossing at the location in Miles City would serve as mitigating measures.

Tongue River Railroad trains would cause an incremental increase in train traffic in downline corridors and an increase in general vehicle and emergency vehicle delays. By 2011, TRRC-originated trains would delay no more than 3 percent of general vehicle traffic for 1.3 to 1.7 minutes. Although an inconvenience to travelers, the delays would not affect community development. TRRC-caused delays to emergency service vehicles would not be significant, representing a 3 to 6 percent delay of emergency traffic for 1.3 to 1.7 minutes. Urban areas that would experience long term difficulties from increased train traffic are Billings, Fargo/Moorhead, and Spokane. Grade-crossing improvements and the installation of grade-separated crossings would help mitigate problems in those communities.

The construction of surface coal mines in the Ashland/Birney/Otter Creek area would result in increased traffic on area highways. Al-

though no new highways would be required, current highways would need widening, paving, realignment, and structural enhancement. For primary roads the cost to upgrade the highways would be \$2 million, while the cost would be \$13.3 million for secondary roads.

4.4 ENERGY IMPACTS

4.4.1 Construction

The construction of the Tongue River Railroad Company's proposed railroad would affect the use of energy in the project area. The net energy impact of the proposed railroad was determined by estimating the amount of energy that would be produced by the anticipated coal mines and by comparing that figure to the amount of energy that would be consumed in the construction and operation of the railroad and of the mines. The net energy balance was calculated in terms of British Thermal Units (BTU), and is presented in section 4.4.5.

The major fuel-consuming activity in constructing the TRRC rail line would be earthwork, including the transportation of ballast and sub-ballast materials, as well as the preparation of the roadbed. Approximately 20 million cubic yards of material would be moved for the construction of the rail line. Fuel consumption by heavy equipment is estimated to range from 0.25 gallon to 0.75 gallon of diesel fuel per yard of material moved. Thus, the fuel consumption for the construction phase would range from 5 million to 15 million gallons. For the analysis of the net energy impact the midpoint of this range, 10 million gallons was applied. This estimate equals 1.4 trillion BTUs. The estimate of fuel consumption would not differ appreciably by alternative route.

4.4.2 Operation and Maintenance

An estimated 430 to 690 million tons of coal may be hauled from the project area during the analysis period. The BTU equivalent of this coal ranges from 7,430.4 trillion to 11,885.2 trillion. The fuel used by the TRRC trains to transport this coal within the project area is an estimated 61 million gallons for the proposed railroad, 85 million gallons for trains operating on the Tongue River Road route, 92 million gallons for the Moon Creek route, and approximately 66 million gallons for the Colstrip route.

4.4.3 Downline Operations

The transportation of coal along the downline corridors also would require the consumption of diesel fuel. Approximately 977 million gallons of fuel would be consumed for the proposed railroad during the analysis period. This estimate would not change for the alternative alignments, since the downline corridors are the same for all alternatives.

4.4.4 Related Actions

The energy used to construct and to operate five potential mines in the project area would total 82.3 trillion BTUs under the medium coal production scenario. This figure would rise to 108.6 trillion BTUs for the high scenario and decrease to 67.9 trillion BTUs for the low scenario. These estimates do not differ by alternative route.

4.4.5 Overall Impact

Subtracting the energy consumed in mine and railroad operations from the BTU content of the mined coal provides an energy balance. The calculations indicate that the amount of energy that would be produced as a result of the operation of the proposed rail line and the mines exceeds the amount of energy consumed by almost 4,000 percent (see Table 4-4).

TABLE 4-4

SUMMARY OF ENERGY IMPACTS: NET ENERGY BALANCE, 1984-2011
(trillions of BTUs)

COAL PRODUCTION SCENARIO	PROPOSED ACTION	TONGUE		
		RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE
Low	7,204.4	7,237.7	7,236.8	7,232.0
Medium	8,782.4	8,779.0	8,778.0	8,772.1
High	11,581.9	11,577.7	11,576.3	11,568.4

4.5 AIR QUALITY

Construction and operation of the proposed railroad and the related mines are expected to increase pollutants in the vicinity of activity. The extent of that increase is discussed in the following section. Under the "No Action" Alternative, the railroad and mines would not be constructed. Consequently, increased levels of gaseous pollutants and particulates associated with railroad and mine development would not occur.

4.5.1 Construction

The major sources of pollutant emissions caused by the construction of the Tongue River Railroad Company's (TRRC) proposed rail line include the wind erosion of surfaces divested of vegetation, the entrainment of dust produced by scraper and dozer operations, and the combustion of diesel fuel by heavy equipment. Generally, these construction-related impacts would be of short duration, lasting only

as long as the construction period. Table 4-5 summarizes Air Quality impacts.

TABLE 4-5

SUMMARY OF AIR QUALITY IMPACTS

	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE	ASHLAND NW ALIGNMENT ^a
(1) EMISSIONS DURING CONSTRUCTION					
Windblown Dust (tons/year)					
1985-87	380	424	394	237	(15)
1988-89	36	36	36	36	9
Other Dust (tons/year)	500 -1,500	500 -1,500	500 -1,500	500 -1,500	--
Heavy-equipment Emissions (tons/year)					
TSP	68 - 205	68 - 205	68 - 205	68 - 205	--
SO ₂	78 - 234	78 - 234	78 - 234	78 - 234	--
CO	246 - 737	246 - 737	246 - 737	246 - 737	--
HC	106 - 317	106 - 317	106 - 317	106 - 317	--
NO ₂	1,048 -3,143	1,048 -3,143	1,048 -3,143	1,048 -3,143	--

^a Add (subtract) this figure from each alternative to include Ashland NW Alignment

(2) CUMULATIVE FUGITIVE-DUST EMISSIONS FOR FIVE MINES

Mine Construction (total for construction period)	21,082 tons
Windblown (total for construction period)	34 tons
Operation (High Production Scenario/tons per year)	116 tons

(3) COMPARISON OF NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) AND PREDICTED "WORST CASE" POLLUTANT CONCENTRATIONS FROM RAILROAD OPERATION (2011)

POLLUTANT	NAAQS ^a	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE
Total Suspended Particulates (TSP)					
Annual Average	60 ug/m ³	2.4 ug/m ³	3.3 ug/m ³	3.6 ug/m ³	5.4 ug/m ^{3c}
24-hour Average	150 ug/m ³	2.4 ug/m ³	3.3 ug/m ³	3.6 ug/m ³	5.4 ug/m ³
Sulfur Dioxide (SO ₂)					
Annual Average	.03 ppm ^b	.002 ppm	.003 ppm	.003 ppm	.005 ppm ^c
24-hour Average	.14 ppm ^b	.002 ppm	.003 ppm	.003 ppm	.005 ppm
3-hour Average	.5 ppm	.013 ppm	.017 ppm	.019 ppm	.028 ppm ^d

TABLE 4-5. SUMMARY OF AIR QUALITY IMPACTS (continued)

POLLUTANT	NAAQS ^a	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE
Nitrogen Dioxide (NO ₂)					
Annual Average	.05 ppm	.016 ppm	.023 ppm	.025 ppm	.038 ppm
Carbon Monoxide (CO)					
8-hour Average	9 ppm	.08 ppm	.112 ppm	.124 ppm	.18 ppm ^d
1-hour Average	35 ppm	.08 ppm	.112 ppm	.124 ppm	.18 ppm
Hydrocarbons (HC)					
3-hour Average	0.24 ppm	.024 ppm	.034 ppm	.037 ppm	.055 ppm ^d

^a Secondary standard unless otherwise indicated

^b Primary standard

^c 24-hour average

^d 1-hour average

NOTE: The following conversion factors were employed with gaseous emissions:

SO₂ - ppm = 0.00038 ug/m³; NO₂ - ppm = 0.00053 ug/m³;

CO - ppm = 0.00087 ug/m³; Hydrocarbons ppm = 0.0015 ug/m³

Approximately 1,278 acres would be disturbed by rail line construction along the proposed route with the Ashland SE alignment, with 1,168 acres being disturbed to the Montco terminus (1985-1987), and an additional 110 acres being disturbed as a result of the completion of construction to the Otter Creek terminus (1988-1989). This would result in an average of 48.7 acres of disturbance per month during the first phase and 4.6 acres per month during the final phase. These acreage figures were determined by multiplying the length and average width of the affected right-of-way. Actual disturbance figures will vary according to construction schedules, as dictated by weather conditions.

Diesel fuel emissions for all of the possible routes have been estimated:

Total Suspended Particulate (TSP)	68 -	205 tons
Sulphur Dioxide (SO ₂)	78 -	234 tons
Carbon Monoxide (CO)	246 -	737 tons
Hydrocarbons (HC)	106 -	317 tons
Nitrogen Dioxide (NO ₂)	1,048 -	3,143 tons

The construction-related emission rates would cause only a temporary impact to the project area and would be distributed throughout it.

4.5.2 Operation and Maintenance

The operation of the proposed railroad may cause impacts of longer duration than those impacts associated with the rail line's construc-

tion. The two principal sources of pollution that are associated with the operation of the proposed railroad are coal dust and emissions from the combustion of diesel fuel.

4.5.2.1 Coal Dust

Specific calculations and figures have not been generated for the emission of fugitive coal dust from coal cars in transit along the proposed railroad. Although these emission rates have been addressed in preceding environmental impact statements, no consensus has emerged regarding the specific magnitude of these emissions. Some coal dust may be blown from hopper cars and might affect the area immediately adjacent to the right-of-way. However, the Montana Air Quality Bureau suggests that coal dust should settle to the bottom of hopper cars within the first few miles of transport from the mine site, and that it, therefore, should not violate federal or state air quality standards.

4.5.2.2 Diesel Fuel Emission

The TRRC's operation-and-maintenance phase would produce only minimal air quality impacts. Diesel fuel combustion emissions would cause pollutant concentrations well below the applicable federal and state air quality standards, as well as below the Prevention of Significant Deterioration Regulations' (PSD) Class II increments. These emission levels also would not cause violations of the Northern Cheyenne Indian Reservation's Class I air quality status.

The operation of a railroad along the Colstrip alternative route may add to the existing violation of federal and state air-quality standards in the designated Colstrip Nonattainment Area.

4.5.3 Downline Operations

The operation of the proposed railroad would affect air quality areas downline from Miles City. The downline corridors identified in section 4.3 apply to the air quality analysis for the proposed railroad and for its alternatives. In the case of the Colstrip alternative route, the downline corridors are slightly longer to both the east and west than are those corridors for the proposed railroad or for the Tongue River Road or Moon Creek alignments. However, the impact findings apply to all of the routes.

Downline emission figures were generated in terms of maximum 24-hour concentrations. The pollutant impacts would be greatest near the rail line and would decrease with distance from the rail line. Nevertheless, these downline concentrations register well below the applicable federal and state air quality standards, as well as below the pertinent PSD increments.

The downline capacity analysis suggests that it might be necessary to construct some new trackage in the existing rights-of-way by the year 1991. Should this requirement arise, the construction of the second line would cause some temporary impacts to air quality.

4.5.4 Related Actions

The proposed TRRC railroad would serve five surface coal mines projected for the Ashland/Otter Creek area. The air pollution associated with these mines would result from two activities: mine construction and mine operation. These impacts would not differ among alternative alignments for the railroad.

4.5.4.1 Mine Construction

The air pollution related to mine construction would be produced by the activities of overburden removal, site preparation, and locating such support facilities as crushers and loaders. The pollutants include fugitive dust from construction activities and from exposed, disturbed areas, particularly stockpiles. They include also the products of diesel fuel combustion: TSP, SO₂, CO, HC, and NO₂.

The air quality impacts to the Tongue River region, as a result of the construction of the Montco Mine project and of the other four mine projects, are not expected to be significant. The primary construction impacts would occur within the mine boundaries and would be of relatively short duration.

4.5.4.2 Mine Operation

The air pollution generated by the operation of the Montco Mine and of the other four mine projects in the Tongue River region is assumed to extend for the life of each project, although the five peak pollution levels--i.e., "worst case" situations--would be staggered through the several decades of their sequential operation. This pollution would consist of fugitive dust emissions and of the products of diesel fuel combustion by heavy-duty mine equipment.

Based upon the methodology of extrapolating the operation figures for the four supplemental mines from the Montco project operation computations, no violations of federal or state air quality standards or of PSD Class I or Class II increments are anticipated. However, these extrapolated figures do not include the anticipated impact of fugitive dust emissions resulting from the unpaved access road (FAS 566) extending from Ashland to the Montco site. The Ashland area already exceeds the federal and the Montana State air quality standards because of emissions from unpaved roads. Any additional vehicular activity along FAS 566 is expected to increase air quality problems in the Ashland area.

4.5.5 Overall Impact

Air quality impacts during construction of the Tongue River Railroad would include: (1) 800 to 830 tons per year of windblown dust, varying by route; (2) 1,000 to 3,000 tons per year of dust attributable to the operation of scrapers and dozers; and (3) emissions of TSP, SO₂, CO, HC, and NO₂ due to diesel fuel combustion. The operation and maintenance of the railroad would result in minimal air quality impacts along any possible Tongue River Railroad alignment and downline of the alignments. Coal dust blown from railroad cars is not considered to be a threat to air quality. Diesel fuel emissions would cause ground level pollutant concentrations well below federal and state standards, including the Prevention of Significant Deterioration Regulations (PSD) Class II increments and the PSD Class I increment for the Northern Cheyenne Reservation. For the Colstrip Alternative the federal and state standards in the designated Colstrip Nonattainment Area might be violated.

Fugitive dust from construction of the mines and from exposed, disturbed areas of the mines would occur, as well as TSP, SO₂, CO, HC, and NO₂ emissions from the diesel fuel combustion of mine construction equipment. The impacts would be short term. The fugitive dust (excluding that produced from unpaved roads) and diesel fuel emissions expected with mine operation would not cause violation of state and federal air quality standards.

4.6 NOISE IMPACTS

Increased noise levels during construction and operation of the proposed railroad and mines will likely affect some residents of the project area. Estimates of those levels are presented in the following section. Under the "No Action" Alternative, the railroad and the mines would not be developed. Consequently, there would be no increase in noise levels associated with this activity.

4.6.1 Construction

The use of heavy machinery for the construction of the proposed Tongue River Railroad Company (TRRC) rail line would cause temporary increases in noise along the right-of-way. The Adjusted Decibel (dBA) readings during construction would average between 62 dBA and 74 dBA at 200 feet from the right-of-way's centerline and between 54 dBA and 67 dBA at 500 feet from the centerline. At times, decibel readings could register as high as 85 dBA within 50 feet of the centerline.

The increases in noise levels might cause temporary aggravation in the communities of Miles City and Ashland. Yet, few rural residences are located within the 500-foot decibel contour line and, thus, most inhabitants would not be affected significantly by noise during the construction phase.

Mitigating factors for construction-related noise impacts include two measures: that heavy equipment be dispersed along the rail line, thus limiting potential for exposure to high noise levels; that construction normally be restricted during evening hours and on weekends, when human receptors usually are more sensitive to noise disruption.

TABLE 4-6

SUMMARY OF NOISE IMPACTS
(High Coal Production Scenario, 2011)

PROJECTED NOISE LEVELS ALONG TRRC RAIL LINE	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE	ASHLAND NW ALIGNMENT ^a
70-dBA Contour	110 feet	125 feet	140 feet	115 feet	110 feet
Rural residences affected	6	7	7	5	--
55-dBA Contour	3,470 feet	3,980 feet	4,370 feet	3,550 feet	3,470 feet
Rural residences affected	95	90	89	55	4

^a Add these figures to include the Ashland NW Alignment in each alternative

4.6.2 Operation and Maintenance

The operation of the proposed TRRC railroad is expected to cause an increase in noise levels in both rural and urban areas. In rural areas, decibel readings may rise from 40 dBA to 63.5 dBA, with 25 trains per day operating on the line by 2011. However, few rural residences are situated within the 70-dBA contour line established by the Environmental Protection Agency (EPA)--between five and seven, depending on the route. Along the proposed rail line, approximately 95 rural residences are located within the 55-dBA contour line, with 99 rural residences affected under the Ashland NW Alignment. This figure becomes 90 houses for the Tongue River Road alternative route, 89 houses for the Moon Creek alternative route, and totals 55 houses for the Colstrip alternative route. Furthermore, the addition of the TRRC trains to that Burlington Northern (BN) line in the rural area between Colstrip and Nichols would add more than 4 decibels to its existing noise levels over a given 24-hour period (L_{eq}). However, this final L_{eq} would not exceed 65 decibels under any coal production scenario. Increased noise in rural areas may become an aggravation to residents by the year 2011, but it would not pose a significant health hazard.

With operation of the proposed railroad, noise levels in Miles City would rise no more than 3 dBA for the high coal production sce-

nario, except on the abandoned Milwaukee Road rail line in Miles City, on which no current traffic exists. The EPA's 70-dBA contour line would not extend beyond the existing Milwaukee Road right-of-way. The 55-dBA contour line would include an approximately 0.50-square-mile area of Miles City. This analysis indicates that, with 25 trains operating daily in 2011, Miles City residents would not experience significant activity disruption as a result of excessive noise levels. However, two schools, one park, and a number of residences in Miles City would be situated within the 55-dBA contour line. Residents at these locations may experience some noise interference with their outside activities.

In the Ashland area, the 55-dBA contour line generally parallels the proposed rail line at a distance of 3,470 feet. This situation represents a "worst-case" estimate of the contour, since it assumes the maximum train volume under the high coal production scenario. Included in this area are the Tranel Subdivision, the St. Labre Mission, St. Joseph's Village, the Ashland Elementary School, and the Ashland town site. These sites may experience some degree of interference with outside activities as a result of train operations. In this area, though, the 70 dBA contour is located almost entirely within the right-of-way. No sensitive receptors appear within the 70-dBA contour line.

Trains operating on the Tongue River Road or Moon Creek routes would not differ from those on the proposed rail line in potential noise effects on urban areas. However, for the Colstrip route, the L_{eq} increment attributable to the TRRC trains in Colstrip would exceed 4 dBA. The 70-dBA contour line would not reach beyond the existing railroad right-of-way in Colstrip, but the 55-dBA contour line there would extend from the centerline twice the distance of the existing contour line. Two churches, one library, and a number of residences are situated within the incremental contour line. Residents at these locations may experience some noise interference with their outdoor activities.

4.6.3 Downline Impacts

The addition of the TRRC trains would increase the L_{eq} measure by no more than 4 decibels for any downline rail segment. In a representative sample of communities, no additional sensitive receptors were identified within the incremental 70-dBA contour line. However, some additional residences would be situated within the 55-dBA contour line. Residents at these locations may experience some noise interference with their outside activities.

4.6.4 Related Actions

The effects of mine development on ambient noise levels in the project area are functions of the noise associated with running operations and of the noise associated with increased highway traffic. The effects of noise associated with mining generally are confined to the

mining location and to the immediately adjacent area, which is rural. This noise would exert little impact elsewhere. The mine located closest to a community is one situated approximately 5 miles northeast of Ashland. The other mines range in distance from 5 to 10 miles from Ashland. Because of these distances, Ashland would experience no disruptive noise impacts produced by the mining operations.

Some highways in the project area would undergo significant increases in traffic as a result of mine operations. The area projected to receive the largest changes in traffic volumes is located in and around Ashland. The average daily traffic through Ashland may increase from a current level of approximately 900 vehicles to 1,500 vehicles by 1991 and to 3,500 by 2011. More than 50 percent of this traffic represents miners' work trips, and this travel would be concentrated during work shift changes. Other project area roads that are estimated to experience significant average daily traffic increases include: (1) FAS 447, Ashland to Mine Site #4; (2) FAS 484, U.S. 212 to Mine Sites #2 and #3; (3) FAS 566, Ashland to the Montco Mine. L_{dn} measurements were established to acknowledge the increased sensitivity of human receptors to noise during the nighttime hours. L_{dn} s are a measure of noise levels over a 24-hour period, with added weight factored in for the nighttime hours. The 55- L_{dn} contours associated with the projected traffic volumes range from 500 to 1,000 feet from the right-of-way's centerline.

4.6.5 Overall Impact

As train traffic increases on the proposed TRRC rail line, rural areas along the right-of-way would experience rising noise levels. These noise levels could be aggravating to some area residents, but they would pose no significant health hazard to them.

Urban centers in the project area also would experience slightly increased noise levels. In most communities, the noise increments would be no more than 3 dBA. The residents of Ashland probably would experience the greatest noise interference of any of the project area inhabitants.

4.7 SAFETY IMPACTS

Operation of the proposed railroad is likely to have some impacts to area safety. Increases in grade-crossing accidents and derailments are presented in the following section. Under the "No Action" Alternative, the railroad would not be constructed and, therefore, would not contribute to safety problems in the project area.

4.7.1 Construction

During the construction of the proposed railroad, safety impacts in the project area would be minimal. Most safety situations would

involve the operation of heavy equipment by various contractors. These activities would exert a negligible effect on study area safety outside the TRRC work force itself.

4.7.2 Operation and Maintenance

Safety impacts associated with the operation and the maintenance of the proposed rail line and its alternatives primarily concern grade-crossing accidents and train derailments. Both of these concerns are relatively minor during the period (1987-2011). Table 4-7 provides a summary analysis of these impacts.

4.7.2.1 Grade-crossing Accidents

Grade-crossing accidents for the proposed railroad, the Tongue River Road and the Moon Creek alternative routes would total a cumulative 7.6, 8.5, and 7.4 accidents, respectively, through 2011. The associated property damage is estimated not to exceed \$10,250 for TRRC trains, with one injury and one fatality. The related non-TRRC trains are expected to encounter 18.6 grade-crossing accidents through the analysis period, resulting in a combined total of not more than 26.2 accidents. The number of grade-crossing accidents on the Colstrip alternative would be slightly lower than those accidents expected for the proposed action. The number of projected accidents on this alignment is 5.7, producing a combined non-TRRC/TRRC total of 24.3 accidents. Should the Ashland NW Alignment be used, a slight increase in the projected accidents might be anticipated. The increase would be due to the at-grade crossing in the Ashland area, but would not alter substantially the eight accidents projected for the analysis period (1983-2011).

These estimates reflect train traffic for the medium coal production scenario (22 trains per day). The low production scenario (19 trains per day) would result in 23 percent fewer accidents, and the high production scenario (25 trains per day) would involve approximately 30 percent more accidents.

The improvement of crossing-warning devices and/or the construction of grade-separated crossings would help to mitigate grade-crossing accidents. Using the Montana Department of Highways' criteria governing grade-crossing improvements, an estimated 45 percent of the crossings affected by the TRRC trains may warrant upgrading.

4.7.2.2 Derailments

A derailment is defined as an accident in which one or more rail cars leaves the track. The data indicate that TRRC derailments, under the medium coal production scenario, would increase from approximately one in 1991 to eight in 2011. The projected cumulative total of derailments would be 108, 70 percent of which would occur on the TRRC rail line. The remainder would occur either on the Burlington Northern (BN) mainline or spurs in the project area. Some injuries and

TABLE 4-7

SUMMARY OF SAFETY IMPACTS
MEDIUM COAL PRODUCTION SCENARIO

	NON-TRRC	TONGUE RIVER ROAD				MOON CREEK				COLSTRIP			
		PROPOSED ACTION	TOTAL ^a	ALTERNATIVE	TOTAL ^a	PROPOSED ACTION	TOTAL ^a	ALTERNATIVE	TOTAL ^a	PROPOSED ACTION	TOTAL ^a	ALTERNATIVE	TOTAL ^a
(1) CUMULATIVE TOTALS, GRADE-CROSSING ACCIDENTS, 1984-2011													
Expected Accidents	18.6	7.6	26.2	8.2	26.8	7.5	26.8	7.5	26.1	5.7	26.1	5.7	24.3
Property Damage	\$23,000	\$9,500	\$32,500	\$10,250	\$33,250	\$9,375	\$33,250	\$9,375	\$32,375	\$7,000	\$32,375	\$7,000	\$30,000
Injuries	3	1	4	1	4	1	4	1	4	1	4	1	4
Fatalities	2	1	3	1	3	1	3	1	3	1	3	1	3
(2) CUMULATIVE DERAILMENTS, 1984-2011													
		TONGUE RIVER ROAD				MOON CREEK				COLSTRIP			
		PROPOSED ACTION	TOTAL ^a	ALTERNATIVE	TOTAL ^a	PROPOSED ACTION	TOTAL ^a	ALTERNATIVE	TOTAL ^a	PROPOSED ACTION	TOTAL ^a	ALTERNATIVE	TOTAL ^a
# of Derailments		108	108	108	108	108	108	108	108	127	127	127	127
Property Damage		\$4,320,000	\$4,320,000	\$4,320,000	\$4,320,000	\$4,320,000	\$4,320,000	\$4,320,000	\$4,320,000	\$5,080,000	\$5,080,000	\$5,080,000	\$5,080,000
Injuries		6	6	6	6	6	6	6	6	7	7	7	7
(3) CUMULATIVE GRADE-CROSSING ACCIDENTS AND DERAILMENTS DOWNLINE, 1986/87-2011, MEDIUM SCENARIO													
TRRC Train Miles (millions)		88.6	88.6	88.6	88.6	88.6	88.6	88.6	88.6	88.6	88.6	88.6	88.6
Accidents		589	589	589	589	589	589	589	589	589	589	589	589
Derailments		797	797	797	797	797	797	797	797	797	797	797	797
Injuries		139	139	139	139	139	139	139	139	139	139	139	139
Fatalities		77	77	77	77	77	77	77	77	77	77	77	77
Damage (\$)		\$32,611,130	\$32,611,130	\$32,611,130	\$32,611,130	\$32,611,130	\$32,611,130	\$32,611,130	\$32,611,130	\$32,611,130	\$32,611,130	\$32,611,130	\$32,611,130

^a Total includes the Proposed Action or the alternative and Non-TRRC

fatalities could result. The derailment losses would be predominantly incurred by the railroad companies and by railroad employees.

The potential for train derailments in Ashland would increase slightly with the Ashland NW Alignment. Although the number of projected derailments would not increase, the proximity of the route to Ashland would increase the possibility that derailments could occur in that community.

A decrease of 18 percent in this derailment figure would apply to the proposed railroad under the low coal production scenario. An increase of 30 percent in the derailments would occur under the high coal production scenario. The derailment figures would not differ among the alternative routes.

It should be noted that no new public safety problems arising from derailments of cars containing toxic or hazardous substances will result due to the TRRC. These substances will not be transported along the new line.

4.7.3 Downline Impacts

4.7.3.1 Grade-crossing Accidents

Grade-crossing accidents involving the TRRC trains in their downline corridors would be relatively few. Given more than 1,500 downline grade crossings, accidents would increase from 2 in 1986/87 to 43 in 2011. A total of 589 accidents are projected to occur between 1987 and 2011 under the medium production scenario. This figure represents a cumulative average of 0.007 accidents per crossing per year. These TRRC accident estimates are low in comparison with national rates.

Under the high coal production scenario, the grade-crossing accident rates may increase by 32 percent. Under the low coal production scenario, the rate may decrease by 18 percent.

4.7.3.2 Derailments

The estimated downline derailment rates are relatively low for the TRRC trains, under the medium coal production scenario. The total number of derailments for the period from 1987 to 2011 is projected at 797 under the medium production scenario. This figure represents a rate of 30 derailments per year--i.e., 0.4 percent of the national total in 1979--or 0.04 derailments per downline mile per year. The percentage of derailments would vary for the high production and for the low production scenarios at the same rates as did the percentages for the grade-crossing accidents: 32 percent and 18 percent, respectively.

These estimates may exaggerate substantially the number of TRRC train derailments downline that are likely to occur, because the TRRC trains would be routed on Burlington Northern mainlines for most of

the distance to their ultimate destinations, and derailments on these BN lines have proven to be substantially fewer than on other lines.

4.7.4 Related Actions

Both grade-crossing accidents and derailments are functions of the estimated total TRRC train-miles and of the increased primary and secondary highway traffic. These latter factors, in turn, are determined by the total coal production from the Montco Mine and from the potential mines in the TRRC service area. The high coal production scenario has been used to determine "worst case" safety impacts. Therefore, to the extent that mine production varies from this scenario, safety impacts would be affected.

4.7.5 Overall Impact

The primary concerns in the assessment of safety impacts for the Tongue River Railroad are grade-crossing accidents and train derailments, both of which statistically would be insignificant. The estimates of accidents would vary by route, ranging from 5.7 to 8.2 accidents through 2011. The predicted accidents would cost up to \$10,250 in property damage and result in one injury and one death. Improvements in crossing-warning devices and/or construction of grade-separated crossings would mitigate the possibility of accidents to some extent. A total of 108 derailments could occur on the TRRC line within the project area under the medium coal production scenario for the proposed railroad, Tongue River Road, and Moon Creek routes. This figure would rise to 127 for the Colstrip route. The losses attributed to the derailments would be incurred by the railroad.

The downline accident and derailment rates of Tongue River Railroad trains would be low in comparison to national rates. About 589 accidents and 797 derailments are projected downline through 2011. The estimates given for accidents and derailments would vary by scenario. More accidents and derailments could be expected under the high coal production scenario; less under the low scenario.

4.8 SOILS AND GEOLOGY

4.8.1 Construction

The construction of the proposed Tongue River Railroad Company (TRRC) rail line could impact soils along the affected right-of-way by increasing the potential for slumping, by compacting soils, by mixing soil horizons, by causing an increase in the amount of soil lost to wind and water erosion, and by disturbing saline and sodic soils which are difficult to reclaim. Table 4-8 provides a summary of potential soils impacts. Under the "No Action" Alternative, the proposed railroad would not be constructed and there would be no associated impact to project area soils.

TABLE 4-8

SUMMARY OF IMPACT TO SOILS AND GEOLOGY

IMPACT CATEGORY	PROPOSED ACTION	TONGUE				ASHLAND NW ALIGNMENT ^a
		RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE		
Soil with Potential for Slump (miles)	27.5	27.3	27.8	18.9		(1.7)
Saline and Sodic Soils Affected (acres)	100	119	46	33		(8)
Soil Lost per Year to Wind Erosion (tons)	25,604	24,925	25,556	18,773		(2,190)
Soil Lost per Year to Water Erosion (tons)	67,500	71,200	72,100	34,600		(10,000)

^a Subtract these figures from each alternative to include the Ashland NW Alignment

4.8.1.1 Soil Slumping

Approximately 27.5 miles of the proposed railroad's right-of-way exhibits the potential for soil slumping. This figure compares with 27.3 miles for the Tongue River Road route, 27.8 miles for the Moon Creek route, and with 18.9 miles for the Colstrip route. This mileage figure would drop by 1.7 miles for all alignments if the Ashland NW Alignment was used. The exact nature of these soils--and the determination that they actually would slump--can only be ascertained from detailed, on-site geologic and engineering tests. These tests would be accomplished during the third phase engineering program, and prior to rail line construction. Soil slumping on approximately 20 acres of newly developed borrow pit area also may become a problem, if immediate reclamation is not instituted.

4.8.1.2 Soil Loss

The most severe potential for short term erosion would occur during the 2-year construction period, when the right-of-way is devoid of vegetation. The amount of soil removed by wind and water erosion, during and after construction, depends both upon the reclamation practices introduced at the project's beginning and upon the time required for stable vegetation to be re-established.

Based on the Universal Soil Loss Equation (USLE), an estimated 67,500 tons of soil may be lost annually along the route of the proposed rail line. This amount compares with 71,200 tons for the Tongue River Road route, 72,100 tons for the Moon Creek route, and with

34,600 tons for the Colstrip route. The USLE is not generally thought to be a precise predictive tool and is assumed to generally overstate total soil loss. These totals could decrease by as much as 10,000 tons per year if the Ashland NW Alignment were followed. The projection for the Colstrip route is considerably less than those estimates for the other routes because its length is much shorter. All of the estimates for the soil loss caused by water erosion assume a "worst case" condition, without revegetation. The TRRC plans to revegetate cut-and-fill slopes as soon as possible after their disturbance. This will serve to reduce the actual soil loss appreciably.

The amount of soil loss caused by wind erosion is similar for the proposed rail line and for the alternative routes. Assuming no mitigative measures, approximately 25,604 tons/year of soil would be lost for the proposed rail line. This figure compares with 24,925 tons/year for the Tongue River Road route, 25,556 tons/year for the Moon Creek routes, and, due to its shorter length, with 18,773 tons/year for the Colstrip route. Standard reclamation techniques--such as mulching, roughening the soil, soil moistening, and vegetative covering--could reduce the effects of wind erosion by as much as 80 to 95 percent.

4.8.1.3 Saline and Sodic Soils

Limitations to the chemical and physical potentials of soils are encountered when saline and/or sodic conditions are present. These limitations affect both the engineering and the vegetation-bearing capabilities of the soil.

A saline soil contains soluble salts in such quantities that they interfere with the growth of most plants. These soils occur in low moisture regimes, such as eastern Montana, and are caused by a lack of the precipitation required to leach soluble salts through the soil profile. These excess salts in the topsoil upset the equilibrium normally encountered by a plant root. Therefore, its water uptake is hindered, creating stress for the plant.

A sodic soil contains sufficient exchangeable sodium to interfere with the growth of most crop plants, either with or without the presence of appreciable quantities of other soluble salts. A sodic condition adds a dimension to the salt problem by causing the soil's clay particles to disperse, rendering the soil almost impermeable. This impermeable soil inhibits water infiltration, promoting runoff and decreasing the amount of water available to the plant.

An estimated 100 acres of the proposed rail line's affected right-of-way acres may contain saline and/or sodic soils. A possible 119 acres of the Tongue River Road route may be comprised of these soils. The Moon Creek route is estimated to contain 46 acres of these soils. The Colstrip route contains the fewest such soils. This right-of-way may include 33 acres in saline and/or sodic soils (see

Figure 4-1). Use of the Ashland NW Alignment would remove roughly 8 acres from each of the totals.

To ensure plant cover, saline and/or sodic soils would require more maintenance and care than would productive soils. If supplemental programs--e.g., remulching, reseeding--are instituted, the erosion hazard of these soils can be reduced.

4.8.1.4 Other Impacts

Eastern Montana is composed predominantly of soils with limited horizon or structural development. The mixing of soil horizons during right-of-way construction could affect the structure of the soil and could impede revegetation. The impacts of soil mixing may be partially mitigated by avoiding the replacement of predominantly sandy or clayey soils on the surface. This may require special handling of topsoil material, a practice commonly required in surface-mining operations.

The use of construction machinery also would compact some soils. The worst effects of compaction occur when the soil approaches its plastic limit. Once beyond the plastic limit, soil compaction begins to decrease, assuming a more liquid action that often produces sinking and the formation of ruts. The compaction of soils is unavoidable on projects such as rail line construction. However, some soil impact can be avoided by timing the construction to avoid periods when the soil is moist. Furthermore, construction activity generally should be confined to the right-of-way, thus limiting the area subjected to soil compaction.

4.8.2 Operation and Maintenance

The impacts to soils from the operation and the maintenance of the proposed railroad or of its alternatives would be less than those impacts created during construction. The greatest operation-and-maintenance impact would be an increase in wind and water erosion prior to the re-establishment of vegetation along the right-of-way. In addition, during the operation of the railroad, desirable vegetation might be reduced by: (1) an indiscriminate attempt to control noxious vegetation along the right-of-way; (2) hydrocarbon spills; (3) grass fires ignited by maintenance crews and their equipment. Soil productivity may be affected if those soil sterilants applied to the right-of-way to control vegetation were to alter the chemical properties of the soil. The resultant lowered productivity would hinder revegetation efforts and would ultimately affect the rate of soil loss caused by wind and water erosion.

4.8.3 Related Actions

During the next 25 years, between 25,889 and 31,349 acres may be disturbed by those surface coal mines served by the TRRC. In a "worst case" situation, 4,320 acres of land would lie unvegetated in any



10

LEGEND

FIGURE 4.1

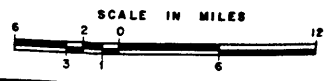
Number	Soil Type	
1	Sodic	----- Proposed Action
2	Saline	----- Alternative Routes
3	Sodic and Saline	TP Terminal Point

SOILS :
SODIC & SALINE
**TONGUE RIVER
RAILROAD COMPANY**

June 1982

Ref: Western Technology and Engineering, Inc. 1981. Technical Report: The Effects of the Tongue River Railroad on Soils. Prepared for Tongue River Railroad Company.

Prepared by
IntraSearch
Billings, Montana



single year. The available data suggest that unaffected soils may cover the area sufficiently to provide an adequate surface soil for reclamation. However, the majority of soils in the project area exhibit poor reconstruction suitability ratings, a condition which would increase the cost of reclamation.

Existing federal and state surface-mining regulations require that the soils and overburden in potential surface-mining areas be surveyed and analyzed in sufficient detail to predict how much soil can be salvaged for reclamation. An adequate reclamation plan must be submitted to the Montana Department of State Lands, and a site-specific environmental impact statement must be prepared for each mine, prior to the issuance of a permit.

4.8.4 Overall Impact

The Tongue River Railroad would increase the potential for slumping and soil loss, as well as disturb saline and sodic soils which might be difficult to reclaim. When the railroad is constructed, 19 to 27 miles of soils could be subject to slumping. On-site testing would be required to determine the nature of the soils in question. Soil loss would occur during and after the railroad's construction, although the most severe potential for short term erosion would occur during construction, prior to revegetation. About 34,500 to 72,100 tons of soil annually would be lost due to water erosion, and 18,773 to 24,925 tons of soil annually would be lost due to wind erosion. The amounts would vary according to route. Revegetation and other reclamation techniques would reduce the effects of erosion. Limitations presented by saline and/or sodic conditions would affect both engineering and revegetation.

Mining would disturb from 25,889 to 31,349 acres of land, of which about 4,320 acres would lie unvegetated in any single year. The majority of soils in the area would present increased costs during reclamation. Each mine would be required to submit a reclamation plan, as well as an environmental impact assessment, prior to the issuance of a permit.

4.9 HYDROLOGY AND WATER QUALITY

4.9.1 Construction

The construction of the Tongue River Railroad Company's proposed railroad or its alternatives potentially would produce four types of hydrologic impacts: (1) the effects of augmented erosion and the resultant increases in stream sediment load; (2) changes in surface drainage patterns and/or in aquifer recharge capabilities; (3) impacts from bridge construction and/or from the placement of culverts in streams; (4) effects on flood-prone land. Most construction impacts on the project area's hydrologic balance would be short term, and

little effect would be exerted on the water quality of the Tongue River or Otter Creek. Table 4-9 summarizes these impacts.

Under the "No Action" Alternative, the proposed railroad and mines would not be constructed. Therefore, there would be no additional soil loss due to the railroad or consequent increases in Total Suspended Solids (TSS) or Total Dissolved Solids (TDS) in area streams. Similarly, mining would not occur under the "No Action" Alternative, and thus would not cause degradation to area ground water.

TABLE 4-9

SUMMARY OF HYDROLOGIC IMPACTS

	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE ^a	COLSTRIP ALTERNATIVE	ASHLAND NW ALIGNMENT ^b
(1) INCREASE IN SEDIMENT LOAD TO STREAMS (tons/year)	5,400	5,700	5,800	2,800	(900)
(2) INCREASE IN TSS IN TONGUE RIVER (mg/l)	12	13	13	4	(2)
(3) INCREASE IN TSS IN OTTER CREEK (mg/l)	19	19	19	19	--
(4) INCREASE IN TSS IN ROSEBUD CREEK (mg/l)	0	0	0	15	--
(5) INCREASE IN POST-MINING TDS CONCENTRATIONS IN TONGUE RIVER (mg/l)	423	423	423	423	--
(6) INCREASE IN POST-MINING TDS CONCENTRATIONS IN OTTER CREEK (mg/l)	170	170	170	170	--

^a Yellowstone crossing not included

^b Subtract these figures from each alternative to include the Ashland NW Alignment

4.9.1.1 Sediment Load

Soil erosion caused by railroad construction would impact the project area's surface water system in direct proportion to the amount of additional eroded material that ultimately would enter a stream. Construction of the proposed rail line would add an estimated 5,400 tons/year of soil to project area streams. Sediment load estimates for the Tongue River Road and the Moon Creek routes are higher (5,700 tons/year and 5,800 tons/year) than are those projections for the proposed rail line; but the shorter Colstrip route involves much lower (2,800

tons/year) sediment load estimates. Construction of the Ashland NW Alignment would reduce the sediment load by 900 tons/year.

The increased stream sediment load caused by the rail line's construction is not expected to produce a long term rise in the level of Total Suspended Solids (TSS) for any project area stream. As a result of the construction of the proposed rail line, the TSS level in the Tongue River would rise 12 milligrams per liter (mg/l), and Otter Creek levels would increase 19 mg/l. The TSS increments for the Tongue River Road and the Moon Creek routes in the Tongue River would be similar to those levels cited for the proposed rail line. The Moon Creek route, however, also would require the construction of a super-span bridge across the Yellowstone River. This is likely to cause significant increases of Total Dissolved Solids (TDS). Impacts related to river scouring at the site could include increases in both TSS and TDS levels downstream from the bridge. Use of the Ashland NW Alignment would reduce TSS levels an estimated 2 mg/l.

Much of the Colstrip alternative route lies outside the Tongue River watershed. Consequently, the construction of this route would increase TSS levels in the river only 4 mg/l. With the Colstrip route, the TSS increases in Otter Creek would be similar to the increments produced by the proposed railroad and by its alternative routes. The Colstrip route differs from the proposed rail line and from the alternatives in that it crosses Rosebud Creek. As a result, the TSS levels are expected to rise 15 mg/l in that stream.

The relatively minor increases in TSS concentrations, caused by the construction of any of the possible rail lines, would not alter the suitability of project area water for existing uses. If proper construction methods and mitigative procedures are employed at the Yellowstone crossing, downstream impacts could similarly be minimized. Therefore, Montana water quality standards would not be violated.

4.9.1.2 Surface Drainage Patterns

The construction of the proposed railroad or its alternatives should not greatly affect the project area's existent surface drainage patterns. The installation of properly sized culverts and the maintenance of those culverts would prevent any significant impacts. The area's ground water aquifers would not be affected by rail line construction along any of the potential routes.

4.9.1.3 Bridge and Culvert Construction

The proposed railroad or its alternatives would transect several ephemeral and intermittent streams. The proper selection and placement of culverts at these crossings would prevent any significant impact to the streams. The required culverts would possess the sufficient size to withstand a 100-year flood event. Each culvert would be installed when streamflow was negligible or nonexistent, thus reducing the chance of a temporary increase in a stream's TSS level.

Adjacent stream banks would be seeded and mulched immediately following the culvert's placement, to stabilize the slopes and to reduce soil erosion.

Both the Tongue River and Otter Creek have average annual stream discharge of more than 5 cubic feet per second (cf/s). Dredged material associated with placing bridge piers at the Tongue River crossing and fill material required at the Tongue River and Otter Creek crossings will necessitate permits under Section 404 of the Federal Water Pollution Control Act (P.L. 92-500). The construction of bridges across the Tongue River, across Otter Creek, or the Yellowstone River in the case of the Moon Creek alternative route, and Rosebud Creek in the case of the Colstrip route, may cause temporary increases in these streams' TSS concentrations. Because channel work undertaken during times of high streamflow is detrimental, such work should be accomplished during lower flow periods, when natural TSS levels are reduced. Local TSS concentrations may be temporarily significant during the construction of a bridge, but this impact could be mitigated somewhat by expediting the construction work.

4.9.1.4 Impacts to Flood-prone Areas

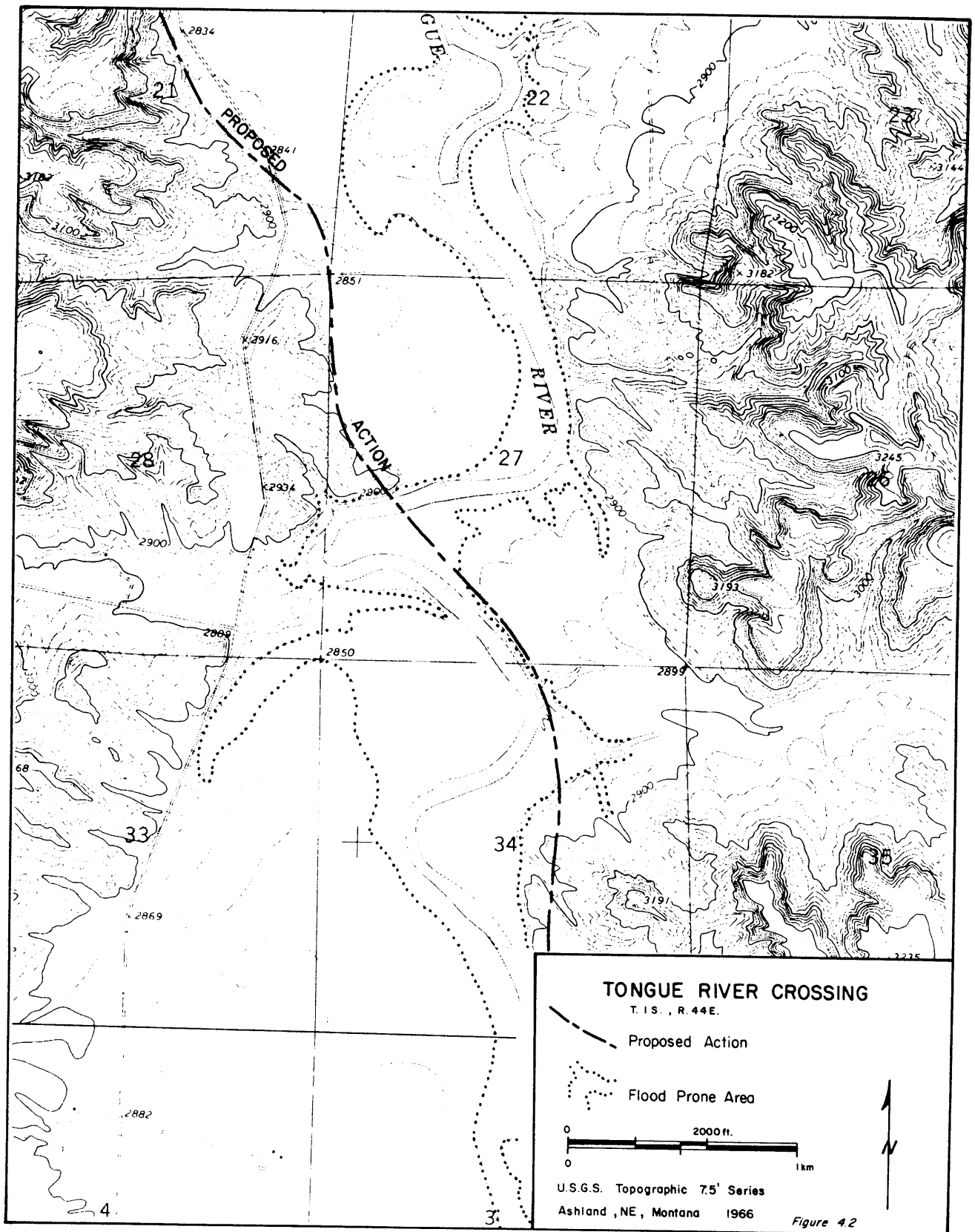
The construction of the proposed railroad or of its alternatives would encroach on flood-prone areas at stream and river crossings. Each of the potential routes crosses the Tongue River once and Otter Creek twice. The Tongue River Road route would transect Pumpkin Creek, and the Colstrip route would cross Rosebud Creek. In addition, as previously noted, the Moon Creek route would cross the Yellowstone River flood plain. All of these intersections would encroach on flood-prone areas (see Figures 4-2 through 4-7).

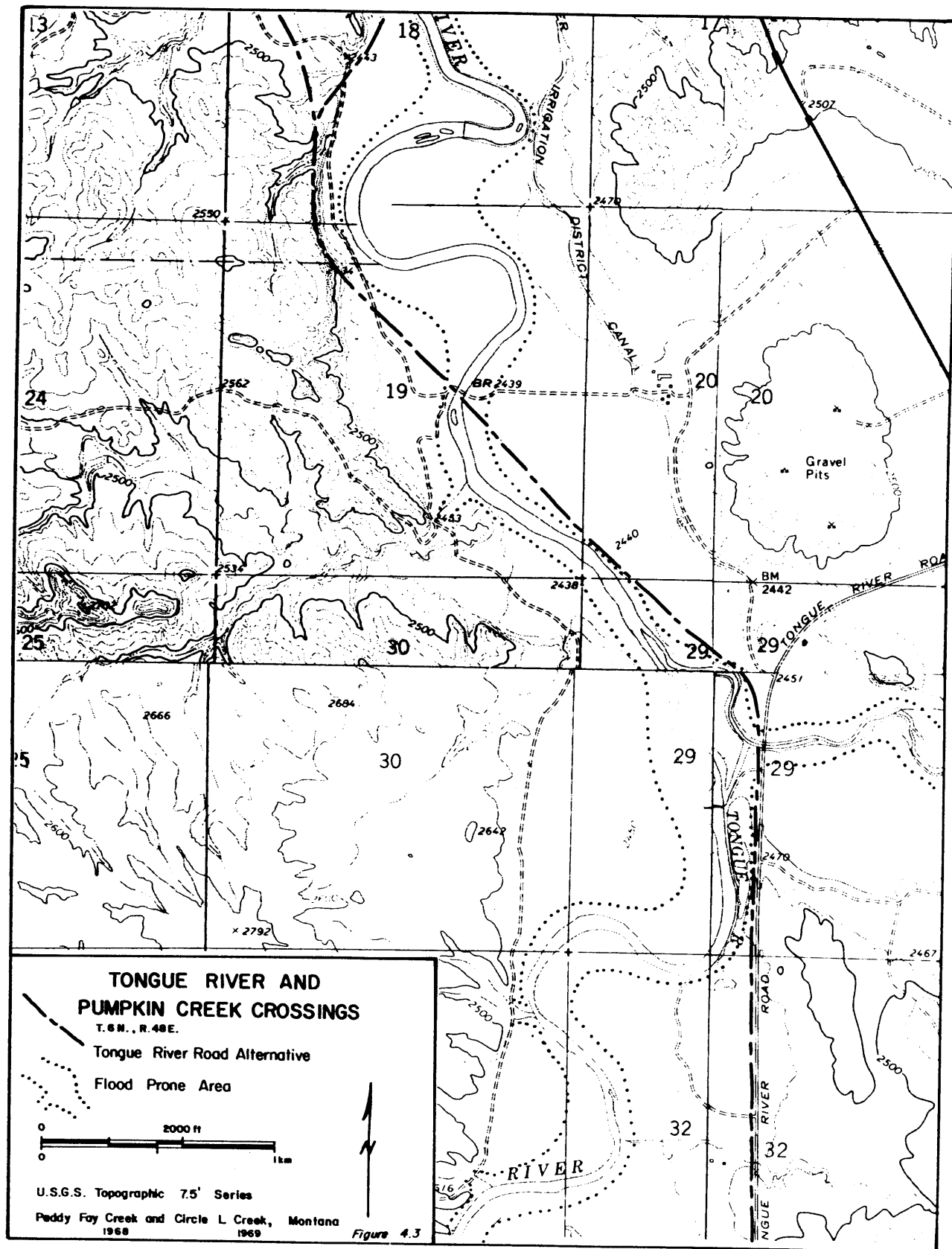
The proper design of the necessary river crossings, and the installation of culverts to expedite stream flow would prevent any significant alteration of the flood plain during a 100-year flood event. The provision of a proper flow capacity would ensure that no bridge could affect the natural moderation of a flood flow.

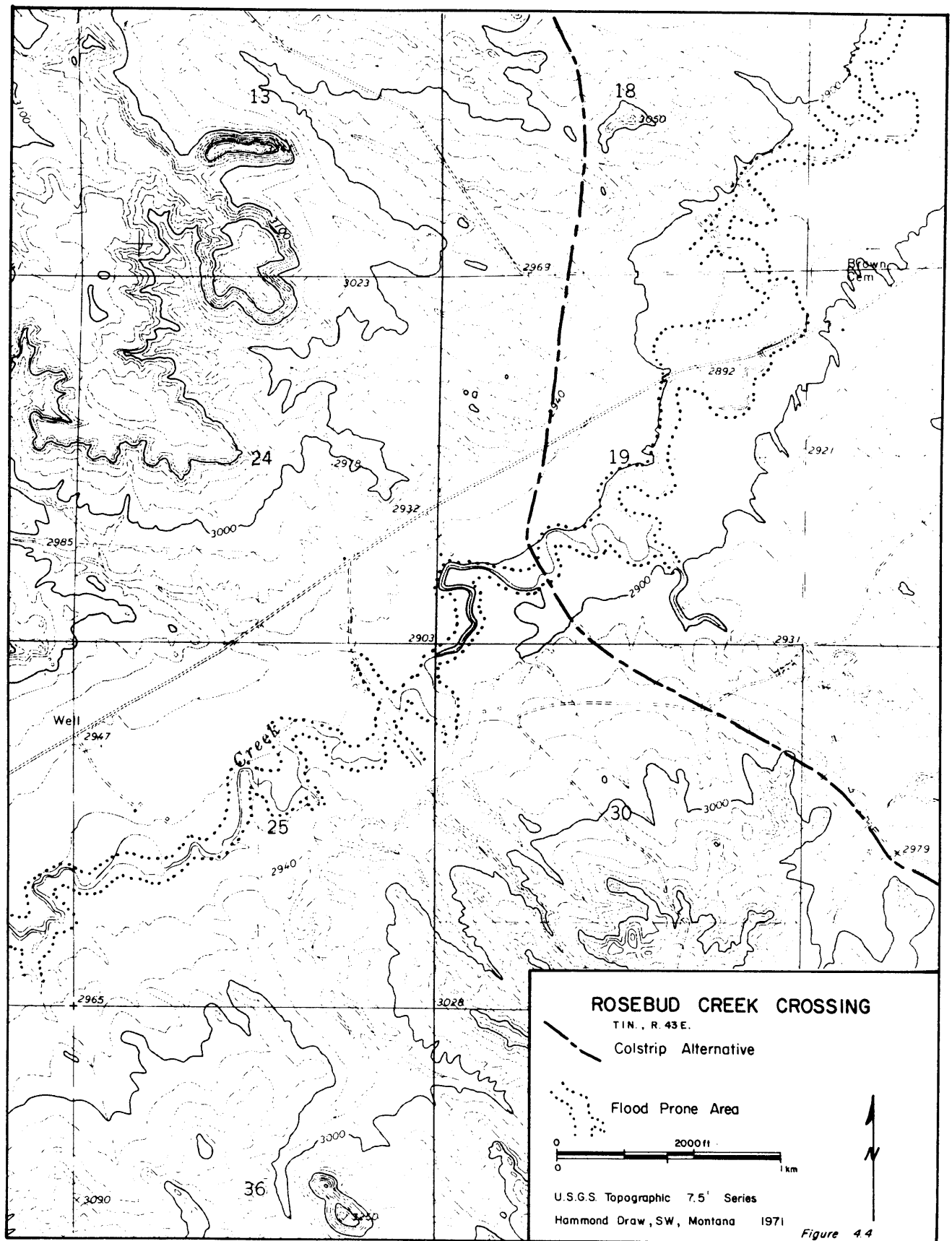
4.9.2 Operation and Maintenance

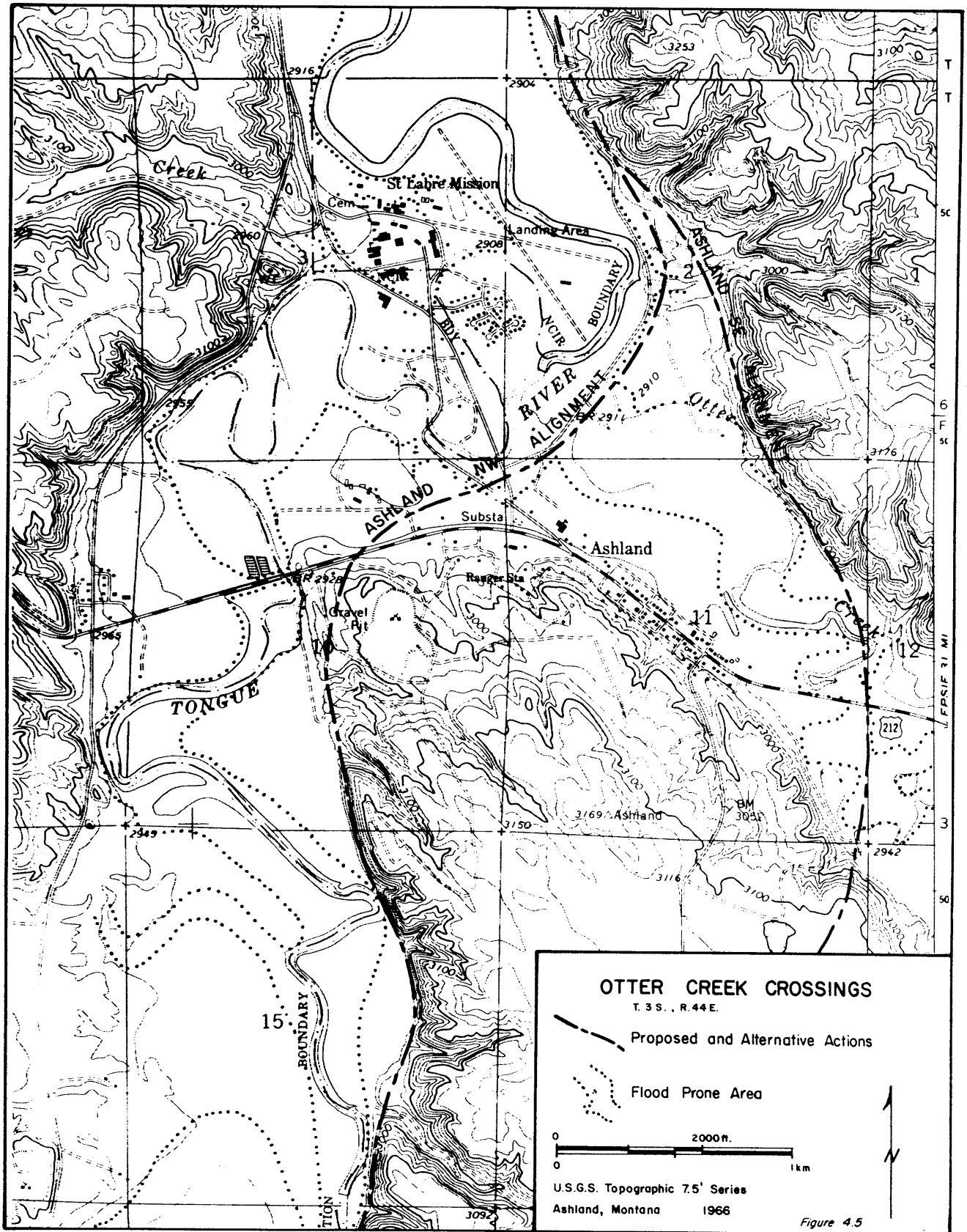
In the course of the railroad's operation, fuel, coal, or herbicides might spill into streams. Since locomotives would be fueled only at the Miles City service yard, diesel fuel spills could result only from derailments. Such occurrences are expected to be rare. Any coal spills similarly would result only from derailments. The potential impacts from herbicide use within the right-of-way might occur from overspraying, from wind drift, or from spills. Judicious attention to correct application procedures should minimize the possibility of such an occurrence.

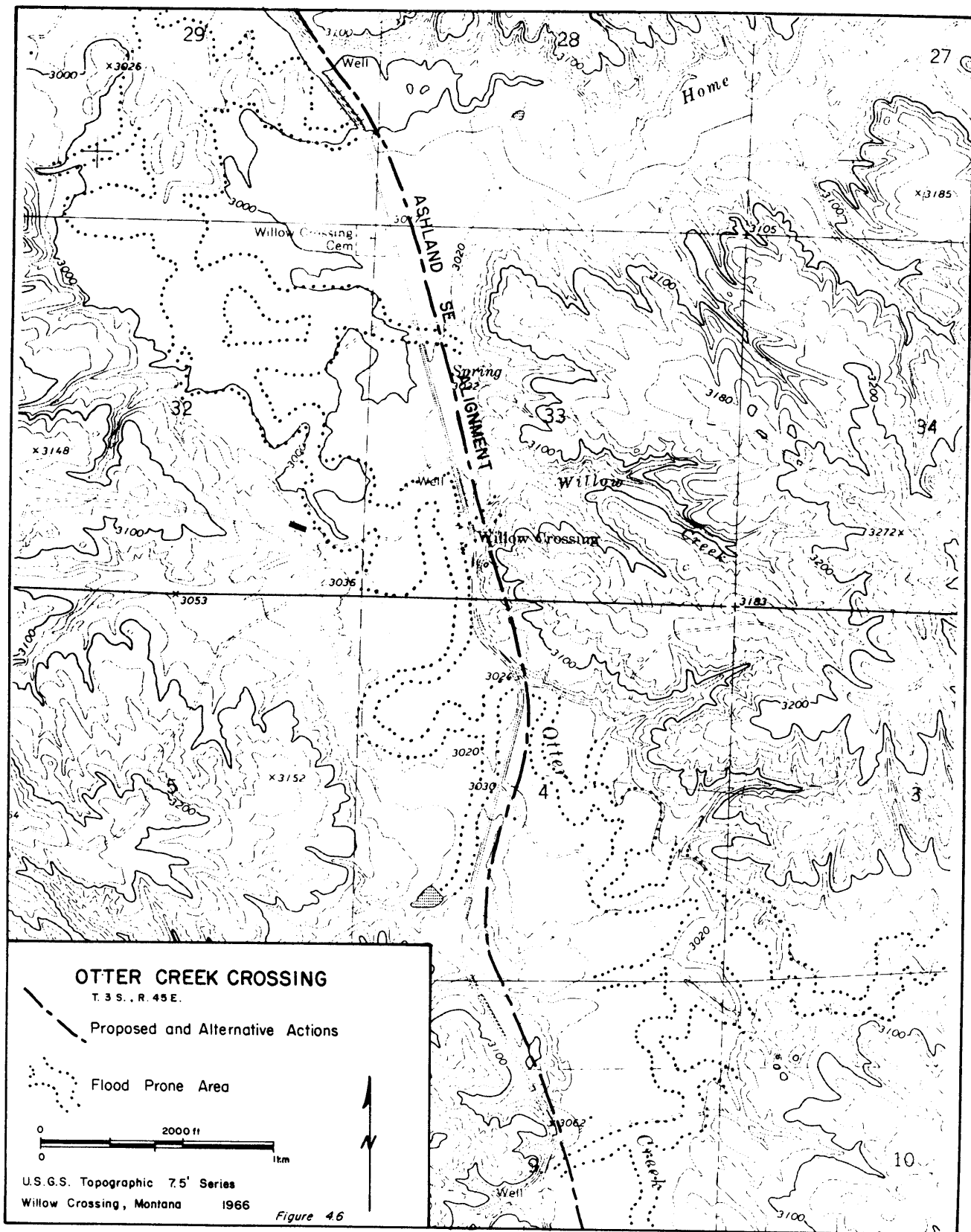
Should either diesel fuel, or coal, or herbicides enter a project area stream, its water quality would be impacted temporarily. The duration of that impact would depend upon the chemical properties of the alien substance, the amount of the substance entering the stream, and the flow characteristics of the stream. The impact to the stream would continue from 1 week to 1 year, depending upon the interplay of these factors.

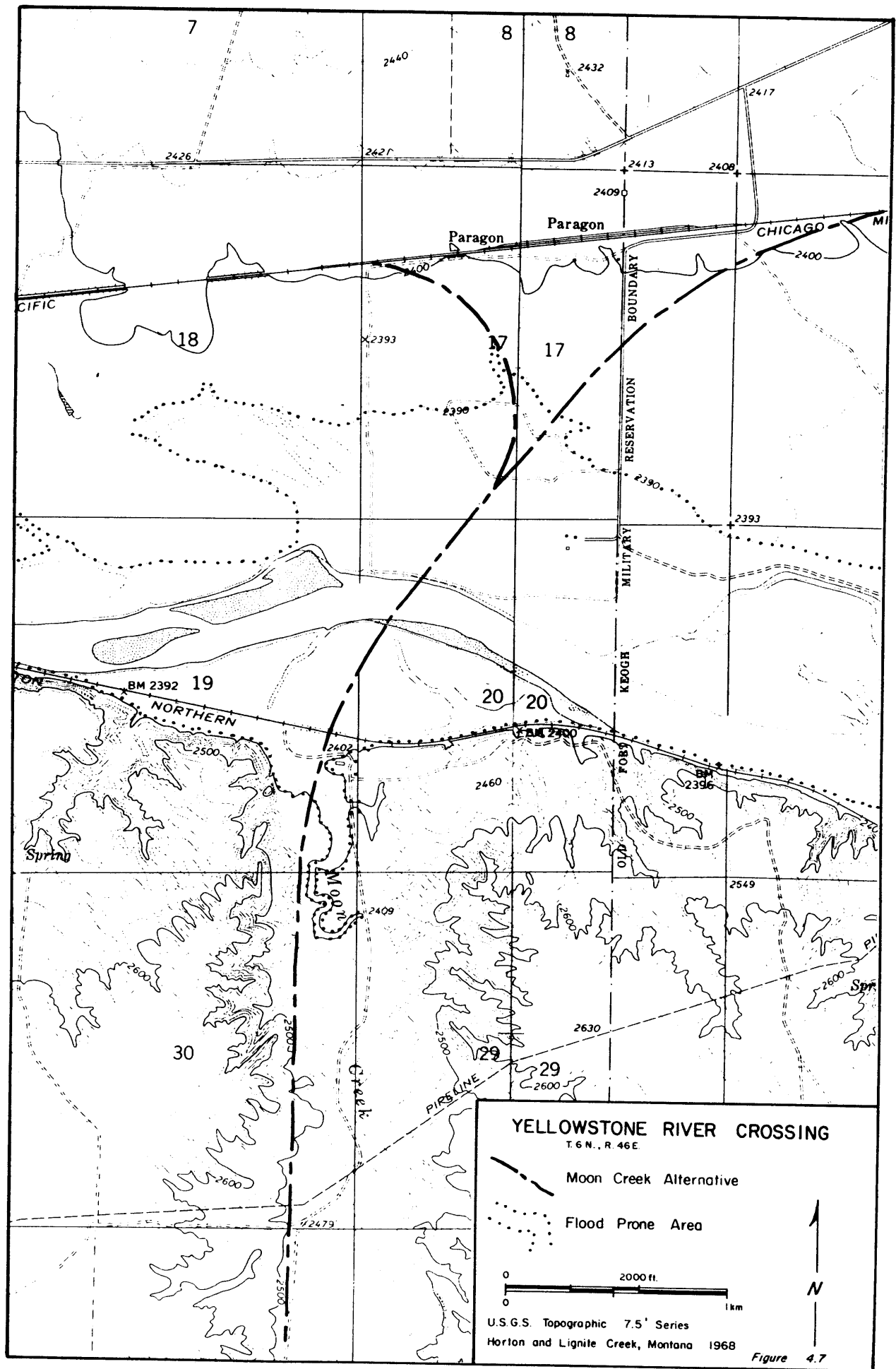












The State of Montana has adopted a Hazardous Materials Response Plan. In the event of a spill of fuel, coal, or herbicide, the TRRC immediately would inform the responsible office in Helena, to initiate emergency measures under this plan.

4.9.3 Related Actions

The primary hydrologic impacts associated with the proposed rail line would result not from the railroad itself, but from the coal mines to be served by the railroad. Thus, these impacts would not differ by alternative rail route. The existing state and federal regulations that govern surface coal mining stipulate that coal mines exert little direct impact upon surface waters. This requirement would apply to each new surface mine in the TRRC service area.

Within the project area, the surface runoff is approximately 25 acre-feet per square mile per year. More than 120 square miles of surface ground would need to be removed from the Tongue River's drainage area to reduce by 1 percent the mean annual flow of the river at Miles City. A disturbed area of less than 50 square miles is estimated for mines in the project area, even under the high coal production scenario--and this total acreage would not be disturbed simultaneously. Thus, the existent sediment control requirements would prevent any significant impact to the flow of the Tongue River.

On a specific, localized basis, strip mining would disrupt the project area's surface water and ground water systems. The coal discharge, ground water losses to the Tongue River alluvium for the five proposed mine projects, total an estimated 1.5 cubic feet per second (cf/s). Therefore, the cumulative effect on the normal river flow of 400 cfs to 600 cf/s would be negligible.

Projections indicate that, within the affected area, the Total Dissolved Solids (TDS) concentrations in the Tongue River alluvial ground water would increase 38 percent above the pre-mining situation. Although an appreciable change in TDS levels, this quality degradation would not significantly reduce the utility of the water for its current uses.

The TDS concentrations also would rise in Otter Creek, following the construction of the projected surface coal mines within that drainage. In the post-mining system, mine spoils would create a salt-loading situation. This condition would increase the average dissolved solids concentration in the Otter Creek alluvial ground water by approximately 1,190 mg/l to 3,780 mg/l. That addition represents a 46-percent increase over the existing condition. In effect, the current dilution of alluvial ground water from the area's bedrock aquifer discharge would be lost in the post-mining system. Thus, the quality of ground water in the alluvium below the mined areas would resemble that quality above the mines. This alluvial ground water quality would remain suitable for livestock water and, therefore, would maintain its suitability for current ground water use.

The average annual TDS concentration in Otter Creek at Ashland is 2,500 mg/l. The level at this location, under post-mining conditions, would rise 7 percent to 2,670 mg/l. The average pre-mining TDS concentration in Otter Creek renders that water unsuitable for irrigation, because of its high salinity content. Therefore, the estimated 170-mg/l increase in the stream's average TDS level, caused by mining, would not affect appreciably the existing suitability of that water for irrigation.

In summary, the project area's surface water and ground water flow regimes would be restored to their pre-mining conditions, in line with those mitigative measures instituted to reclaim surface mines and to protect an area's hydrologic balance that are mandated by state and federal regulations. Quality changes in the spoils' ground waters would be significant. For example, TDS levels in the down-gradient alluvial ground waters would increase 38 percent (1,151 mg/l to 1,574 mg/l) in the Tongue River and would rise 46 percent in Otter Creek. However, the alluvial ground water beyond the specific mining areas would not be impacted.

The baseflow changes in the Tongue River's TDS concentration are estimated to increase less than 10 percent above pre-mining conditions. The baseflow increases in Otter Creek's TDS level are projected to rise by 24 percent at Home Creek and by 77 percent at the mouth of the stream. Nevertheless, these increases would not alter the suitability of either stream to provide water for current uses.

4.9.4 Overall Impact

The impacts of construction of the Tongue River Railroad would be short term, having little effect on water quality. Estimated increases of sediment load would vary with the routes, ranging from 2,800 tons per year to 5,800 tons per year. The relatively minor and short term increases in TSS concentrations would not alter the suitability of project area water for existing uses. With the installation and maintenance of culverts, significant impacts to surface drainage patterns would be prevented. Bridge construction would result in short term, significant TSS concentrations within the areas of construction. Although bridges would encroach on the flood plains, significant alteration to the flood plains could be prevented with the proper design of river crossings. The impact of spills of fuel, coal, and herbicides into area streams would be short term, lasting from 1 week to 1 year.

The main hydrologic impact would result from the coal mines to be served by the railroad. Little impact is predicted in regard to increased sediment load and TDS levels. On a localized basis, surface water and ground water systems would be disrupted, although the cumulative effect on the normal river flow would be small. The surface flow and ground water flows would be restored to their pre-mining condition with reclamation and compliance with state and federal regulations. Although the alluvial ground water quality would not be

impacted beyond the specific mining areas, significant water quality changes would occur in the spoils' ground waters. The increases in TDS concentrations, however, would not alter the suitability of the water for current uses.

4.10 IMPACTS TO AQUATIC ECOLOGY

4.10.1 Construction

The construction of the Tongue River Railroad Company's (TRRC) proposed rail line would impact project area streams and rivers by increasing their sediment load and, possibly, by introducing heavy-equipment fuels and chemicals into the waterways. Furthermore, if constructed improperly, the railroad could alter flood plains and could cause a loss of aquatic habitat. Primary impacts would result from construction of the rail line across streams and rivers in the project area. Table 4-10 provides stream-crossing information. Under the "No Action" Alternative, the project area's aquatic ecology would not be impacted from a railroad or from mines.

TABLE 4-10

SUMMARY OF STREAM-CROSSINGS

IMPACT CATEGORY	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE
Number of Intermittent Stream Crossings	34	25	34	13
Number of Perennial Stream Crossings	2	3	2	3
Number of River Crossings	1	1	2	1

4.10.1.1 Sedimentation

The construction of the proposed rail line would cause temporarily high levels of Total Suspended Solids (TSS) which would be restricted to bridge sites. The installation of a bridge across the Tongue River, located approximately 10 miles north of Ashland, and one across Otter Creek near Ashland would generate a short term impact on aquatic resources.

The two bridge sites do not exhibit high sport fishery value, but they are considered important habitat/species areas. The greatest impact to aquatic ecology would occur if a spawning area were identified at, or immediately downstream from, either bridge site. This possibility could be assessed by instituting site-specific sampling prior to the final alignment of the railroad. Should the resultant data reveal that a river crossing is situated adjacent to a spawning area, a program could be established to accomplish construction during times noncritical to aquatic resources.

River- and stream-crossing sites for the Tongue River Road alternative route differ somewhat from those sites for the proposed rail line. The crossing sites on Otter Creek are the same for both routes. However, the alternative route crosses the Tongue River near Miles City. The overall aquatic resource values for the Tongue River at this point are equivalent to those values for the proposed railroad-crossing site upstream. The impacts, therefore, would be similar. In addition to these bridges, the Tongue River Road route would require a bridge across Pumpkin Creek. This stream carries a high species/habitat value.

The Moon Creek route is similar to the proposed rail line in terms of impacts to the aquatic resources of Otter Creek and the Tongue River. It differs from the proposed route, however, in that it requires the construction of a major superspan bridge across the Yellowstone River. The bridge site is located on a section of the Yellowstone River which is regarded as containing a "high priority fishery resource." The area has been given high values for its sport-fishing potential and the quality of habitat and species composition it contains. Bridge construction could temporarily block fish passage through the reach. In addition, spawning habitat could be impacted if it occurs at or below the bridge site. Site-specific sampling and construction scheduling, based on critical time periods for affected species, could preclude serious impacts.

The Colstrip alternative route would differ from the proposed rail line and from the other alternatives in that it would cross Rosebud Creek. This stream also holds a significant species/habitat value.

The proposed railroad and the various alternative routes differ in the number of intermittent streams that each would cross. The proposed rail line would cross 34 streams, 25 streams would be crossed by the Tongue River Road route, 34 by the Moon Creek route, and 13 by the Colstrip route. Culverts would be used to cross intermittent streams. They should possess sufficient size to minimize any increases in TSS concentrations due to improper drainage (see Table A9-3). The proper placement of culverts in only those smaller, intermittent streams which generally do not support important fisheries should mitigate any significant impacts to aquatic resources in the project area.

Although the construction of the TRRC railroad or of its alternatives would cause temporarily large increases in the TSS levels at bridge sites on the Tongue River and its tributaries, it would not result in any long term additions to the TSS count. TSS concentrations would rise by an estimated 12 milligrams per liter (mg/l) to 13 mg/l in the Tongue River and 19 mg/l in Otter Creek. Those levels remain the same for the Tongue River Road and the Moon Creek alternative routes. With the Colstrip route, 4 mg/l of TSS would be added to the Tongue River, 19 mg/l to Otter Creek, and 15 mg/l to Rosebud Creek. None of these expected TSS increases would be sufficient to affect significantly the area's aquatic ecology.

Temporary increases in TDS are likely to occur as a result of the Yellowstone River crossing on the Moon Creek alternative route. Proper construction procedures, adequate drainage structures and sediment control devices should alleviate impacts to the aquatic systems.

4.10.1.2 Fuel and Chemical Spills

Fuel and oil spills into the Tongue River, into Otter Creek, or possibly into intermittent streams could cause short term impacts to aquatic organisms. Most fuel oils, composed of lightweight, aromatic compounds, are very toxic to aquatic organisms, but they biodegrade rapidly. Heavier hydrocarbons could remain evident in stream sediments for longer periods after a spill. The effects of such an occurrence could be evident for as little as a week or for as long as a year after the incident.

Several actions could mitigate the potential impacts from fuel and oil spills: (1) preventing construction equipment from directly entering a stream during bridge construction; (2) locating culverts only during times of minimal or nonexistent water flow; (3) developing an "Oil Spill Contingency Plan."

4.10.1.3 Construction in Flood-prone Areas

In crossing the Tongue River or Otter Creek, either with the proposed rail line or with any of its alternatives, encroachment on flood-prone areas would be necessary. Likewise, the Moon Creek route will require crossing the Yellowstone River flood plain by the approaches to the bridge. A proper bridge design, with the provision of a sufficient flow capacity, should prevent any significant alteration of the flood plain and, thereby, should insure against the loss of aquatic habitat. The timing of the railroad grade construction, to avoid high discharge periods, and the stabilization of the railroad bed soon after its completion would help to prevent impacts to the flood plain and, consequently, to the aquatic resources.

4.10.2 Operation and Maintenance

4.10.2.1 Fuel and Chemical Spills

Accidental fuel or chemical spills from the operation of the TRRC trains could impact aquatic resources. Depending upon the location of the spill, aquatic flora and fauna may be affected for between 1 week and 1 year after the accident. Coal spills in spawning areas, caused by train derailments, could interfere with fish propagation. A discussion of the potential for train derailment is presented in section A7.0, and a more detailed discussion of the possible impacts to water quality from accidental spills is presented in section A9.1.2.

4.10.2.2 Use of Herbicides in Right-of-way Maintenance

Herbicides--most likely 2,4-D--could be used to curtail the growth of noxious weeds within the TRRC right-of-way. The possible overspraying and wind drifting of herbicides should not introduce toxic substances into a waterbody in amounts that would be toxic to aquatic biota. However, toxic substances would occur in the immediate vicinity of a herbicide spill, but would be dispersed quickly because of the high water solubility of 2,4-D and the natural mixing in the stream. An additional discussion of potential herbicide problems is presented in section A9.1.2.

4.10.3 Related Actions

The impact to surface water quality, caused by the establishment of mines in the study area, is discussed in section A9.1.3.1. Existing federal and state regulations should protect aquatic resources from increased sediment loads, which could result from mining. The Total Dissolved Solids (TDS) levels would rise in both the Tongue River and Otter Creek as a result of the operation of the five projected mines. However, the expected TDS levels should not alter the suitability of this water for existing uses, and they should not impact aquatic resources significantly.

4.10.4 Overall Impact

The Tongue River Railroad would affect the quality of the aquatic habitat because of the increased sediment load to the area's streams and the potential for spills of toxic fuels and chemicals. The increase in TSS would occur during the construction of bridge crossings and, thus, represents a short term impact to area streams. For all the alignments, bridges across the Tongue River and Otter Creek would be built in important habitat areas. The Tongue River Road, the Colstrip, and the Moon Creek routes have crossing sites in areas that have significant species value and significant habitat value. Site-specific sampling would be required to determine if spawning areas would be affected.

Fuel spills, coal spills, and herbicide use could be the long term impacts to aquatic resources. Aquatic resources should be protected from increased sediment loads attributable to the coal mines by existing federal and state regulations. TDS levels are not expected to alter the suitability of the project area streams for existing uses.

4.11 TERRESTRIAL ECOLOGY

Construction and operation of the proposed railroad and mines would temporarily and/or permanently remove some vegetation from the project area. Terrestrial wildlife also would be affected by operation of the railroad and the mines. Impacts to the terrestrial ecology of the project area are presented in the following section. Under the "No Action" Alternative, there would be no impacts to terrestrial ecology from the proposed railroad or the mines.

4.11.1 Construction

4.11.1.1 Vegetation

The construction of the Tongue River Railroad Company's proposed rail line would remove an estimated 1,278 acres of vegetation. This figure compares with a disruption of 1,413 acres for the Tongue River Road route, 1,323 acres for the Moon Creek route, and 838 acres for the Colstrip route. These totals would be slightly less if the Ashland NW Alignment were followed (46 fewer acres). Vegetation types receiving the most impact from the construction of any of the rights-of-way include big sagebrush, prairie, agricultural, and silver sagebrush.

TABLE 4-11

VEGETATION AND WILDLIFE HABITAT LOST DUE TO THE RIGHTS-OF-WAY
(Acres)

PROPOSED ACTION	TONGUE				ASHLAND NW ALIGNMENT ^a
	RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE		
1,278	1,413	1,323	838		(46)

^a Subtract this figure from each alternative to include the Ashland NW Alignment

No unique, threatened, or endangered vegetation species are now known to occur along any of the possible rights-of-way. However, a tentative list of plant species of interest being prepared by the Montana Rare Plants Project may include species occurring in the

region. Some of the affected lands are highly productive or provide important wildlife habitat and are limited in the project area. A total of 56 acres of irrigated land and deciduous tree/shrub (riparian) vegetation, of which none is considered prime farmland, would be impacted by the proposed railroad. This category of affected acreage would rise to 114 acres for the Tongue River Road route; 17 acres of this total are considered prime farmland. The Moon Creek route would affect 56 acres of these limited or unique vegetation types, while the Colstrip route would affect 15 such acres. None of this is considered prime farmland.

Other impacts that might result from construction include:

- (1) The loss of vegetation until revegetation is accomplished successfully
- (2) The long term elimination of the natural vegetation mosaic and a decrease in the species diversity on disturbed areas
- (3) The short term, and possibly long term, changes in species composition. Cool season species tend to succeed better in disturbed areas than do warm season species
- (4) Because reclaimed vegetation is more susceptible to drought, reseeding may be necessary
- (5) Species requiring specialized microenvironments would exhibit poor long term success on reclaimed surfaces
- (6) Reclaimed and native vegetation near the proposed mines would be impacted by such factors as dust, off-road vehicle travel, and fire. Such impacts would cease with mine abandonment

The early implementation of an appropriate revegetation plan, as outlined in section A11.1.1.1, would help to mitigate impacts to vegetation.

4.11.1.2 Wildlife

The amount of wildlife habitat that would be removed by the proposed railroad or by its alternatives is the same as that acreage indicated for vegetation. Within the rights-of-way exist 10 distinct wildlife habitats that correspond to the vegetation types identified in the preceding section. Of these habitat types, deciduous tree/shrub, wetland, and pine/juniper are the most important to wildlife. These habitat types constitute roughly 5 percent of the proposed rail line and Tongue River Road routes' rights-of-way. Approximately 3 percent of the Moon Creek route is composed of these habitat types. Roughly 7 percent of the Colstrip route is made up of this habitat group.

The construction of the proposed railroad or its alternatives would cause the limited disruption of important wildlife habitats. Very little riparian habitat would be affected. However, the construction of the rail line could cause a significant disruption to mule deer and antelope moving between the area's upland terraces and the Tongue River. Moreover, noise, dust, and traffic associated with

rail line construction could cause some animals to avoid areas that they normally would inhabit. However, this latter impact generally would be short term, extending only through the construction phase of the project.

Special wildlife use areas, such as grouse leks, fawning sites, and riparian habitat, exist in the project area. However, none yet has been found on the specific route of the proposed rail line or on the alternative routes. In addition, the area contains potential cliff-nesting sites for raptors. Rail line construction near these locations could cause temporary or permanent disruption to wildlife. A thorough field reconnaissance of the proposed right-of-way prior to rail line construction would identify the presence of these sites. Timing the construction to avoid conflicts with wildlife would help to mitigate impacts, should the survey identify specific, active wildlife use areas.

Indigenous populations of endangered species--principally the peregrine falcon and the blackfooted ferret--have not been documented in the project area. Wintering populations of bald eagles along the Tongue are not likely to be adversely affected. Should an endangered species be located during a pre-construction survey of the proposed alignment, appropriate action will be taken under section 7 of the Endangered Species Act of 1973, as amended.

4.11.2 Operation and Maintenance

4.11.2.1 Vegetation

The operation and maintenance of the proposed rail line or its alternatives would produce a limited effect on the project area's vegetation. The use of chemical, rather than mechanical, methods of weed control along the right-of-way could affect vegetation outside of the right-of-way. Fires started by locomotives would cause significant short term damage to the area's vegetation and possible long term damage where ponderosa pine and deciduous tree species are affected. Increased erosion as a result of fires also could result in long term adverse effects. However, the proper maintenance of equipment should minimize this potential source of impact. Finally, coal dust from operating trains could affect vegetation along the right-of-way. However, the coal dust emission from TRRC trains is expected to be negligible (see section 4.5.2.1).

4.11.2.2 Wildlife

The operation and maintenance of the proposed rail line also is expected to exert an impact on the project area's wildlife population. Increased human activity, noise disturbance, train-related fires, and possibly train/wildlife collisions would generate some impact on wildlife. The most significant potential impact, however, would be the barrier that the rail line might create to wildlife movement.

Deer should experience little difficulty crossing the rail line. However, antelope might not cross the right-of-way if its fencing is woven wire or multistrand barbed wire, with a bottom wire less than 16 inches above the ground. The use of a three-strand or a four-strand barbed wire fence, with a barbless bottom wire more than 16 inches above the ground, should prevent this potential barrier to antelope movement. The construction of a three-strand, 2,400-volt communication/transmission line within the rail line right-of-way should not pose a problem for raptors. The line is designed to minimize the possibility of contributing to raptor mortality.

4.11.3 Related Actions

4.11.3.1 Vegetation

The construction of the TRRC's rail line assumes the railroad's potential to serve several new, project area coal mines. All three coal production scenarios envision five new mines in that service area. Between 25,889 and 31,349 surface acres would be disturbed during the next 26 years, depending upon the coal production scenario. Revegetation normally follows mining by 2 to 5 years. Thus the total unvegetated area existing for any given year can be calculated by totaling the disturbed acres for the preceding 2 to 5 years. Approximately 4,320 acres would be unvegetated in the year 2011 under the high production scenario, assuming that revegetation follows mining by the maximum 5 years.

The generalized impacts of coal mining on vegetation are similar to those impacts resulting from construction. The mitigative measures for these impacts would be the same as those measures considered for the Proposed Action (see section A11.1.1).

4.11.3.2 Wildlife

The number of acres of any particular wildlife habitat type that would be disturbed at any given period by mining operations is difficult to predict. However, the total number of disturbed acres for any given year during the next 26-year period, can be calculated in the manner applicable to vegetation.

The greatest potential impact to wildlife from the related actions derives from the increase in project area population. By the year 2010, under the medium coal production scenario, approximately 6,000 additional people would be living in the region. The impacts to wildlife from the loss of habitat, resulting from urban expansion, from increased rates of vehicle/wildlife collision, and from additional legal and illegal game kills, could be significant. The mitigation of these impacts could be accomplished by the enhancement of wildlife in other areas, by trade-offs in the management of public lands, and by careful human management.

4.11.4 Overall Impact

The amount of vegetation and wildlife habitat that would be lost because of the Tongue River Railroad would vary with the alignments, ranging from 838 acres to 1,413 acres. For all the routes, the vegetation types that would experience the most impact would be big sagebrush, prairie, agriculture, and silver sagebrush. A revegetation plan would be required to mitigate the impacts. Important wildlife habitats would be disrupted only to a limited degree. However, deer and antelope would be subject to disruption in movement patterns. A field reconnaissance identifying wildlife use areas would be required to determine additional impacts on specific use species. No documentation exists currently that endangered or threatened species of wildlife and vegetation are present in the project area.

A limited effect on vegetation and wildlife would result from the use of herbicides and the occurrence of fires. Impacts to wildlife would also occur because of increased human activity, train/vehicle and wildlife collisions, noise disturbance, and, most significantly, barrier to movement. The impacts of the coal mines to the terrestrial ecology would be similar to those of the railroad. In addition, the impact of urban expansion would occur. This would require more intense management efforts on the part of the various resource custodial agencies.

4.12 CULTURAL RESOURCES

4.12.1 Construction

The construction of the Tongue River Railroad Company's proposed rail line could affect cultural resources by means of: (1) the direct removal or destruction of cultural properties within the right-of-way; (2) a direct construction-related visual or audible impact to sites beyond the right-of-way but within its 3,000-foot corridor; (3) indirect impacts resulting from altered land use patterns or from increased public accessibility to previously remote areas. Under the "No Action" Alternative, cultural resources would not be affected by railroad or mine development. (See Figure 4-8.)

4.12.1.1 Direct Impacts

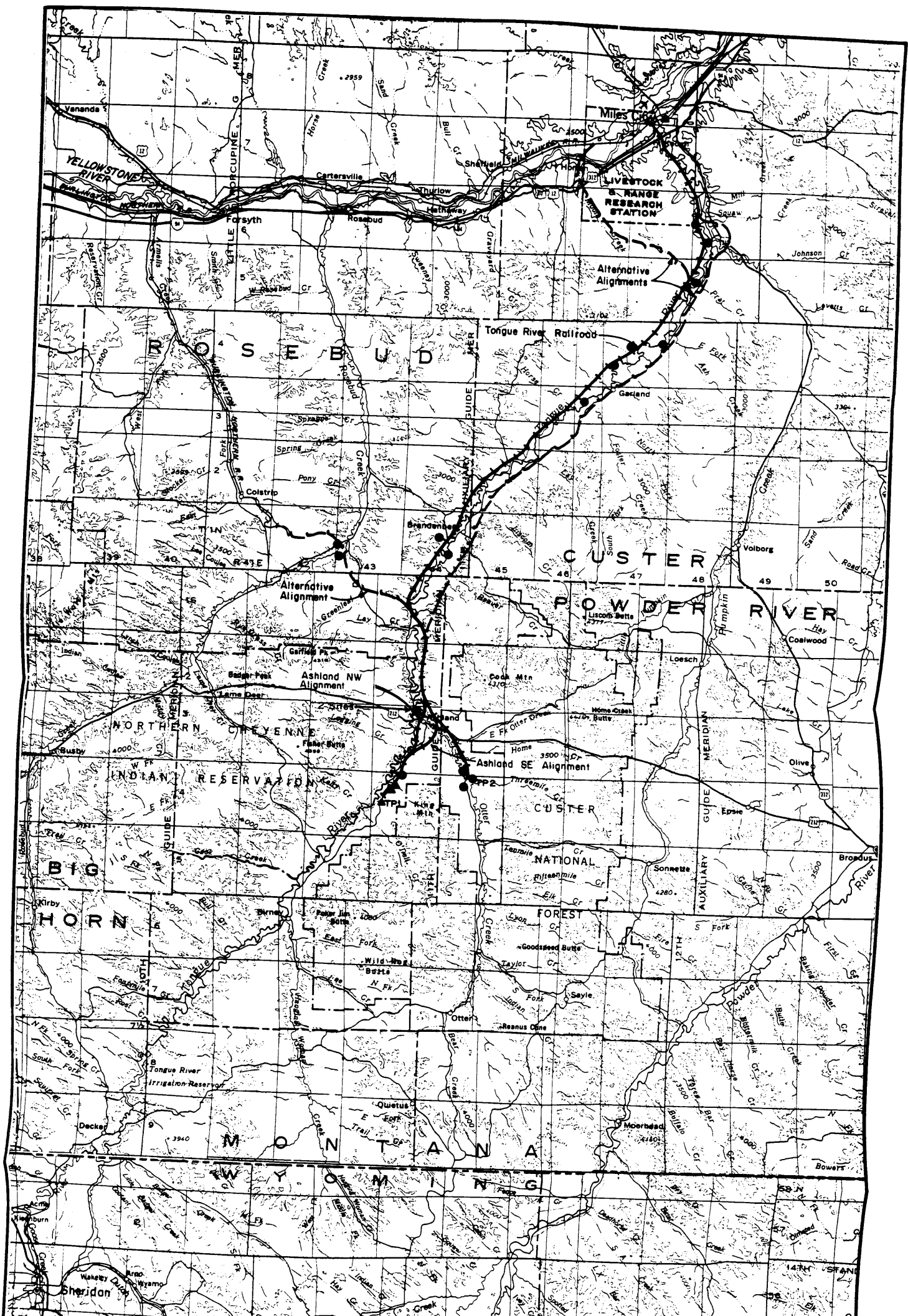
Prehistoric Sites in the Rights-of-Way

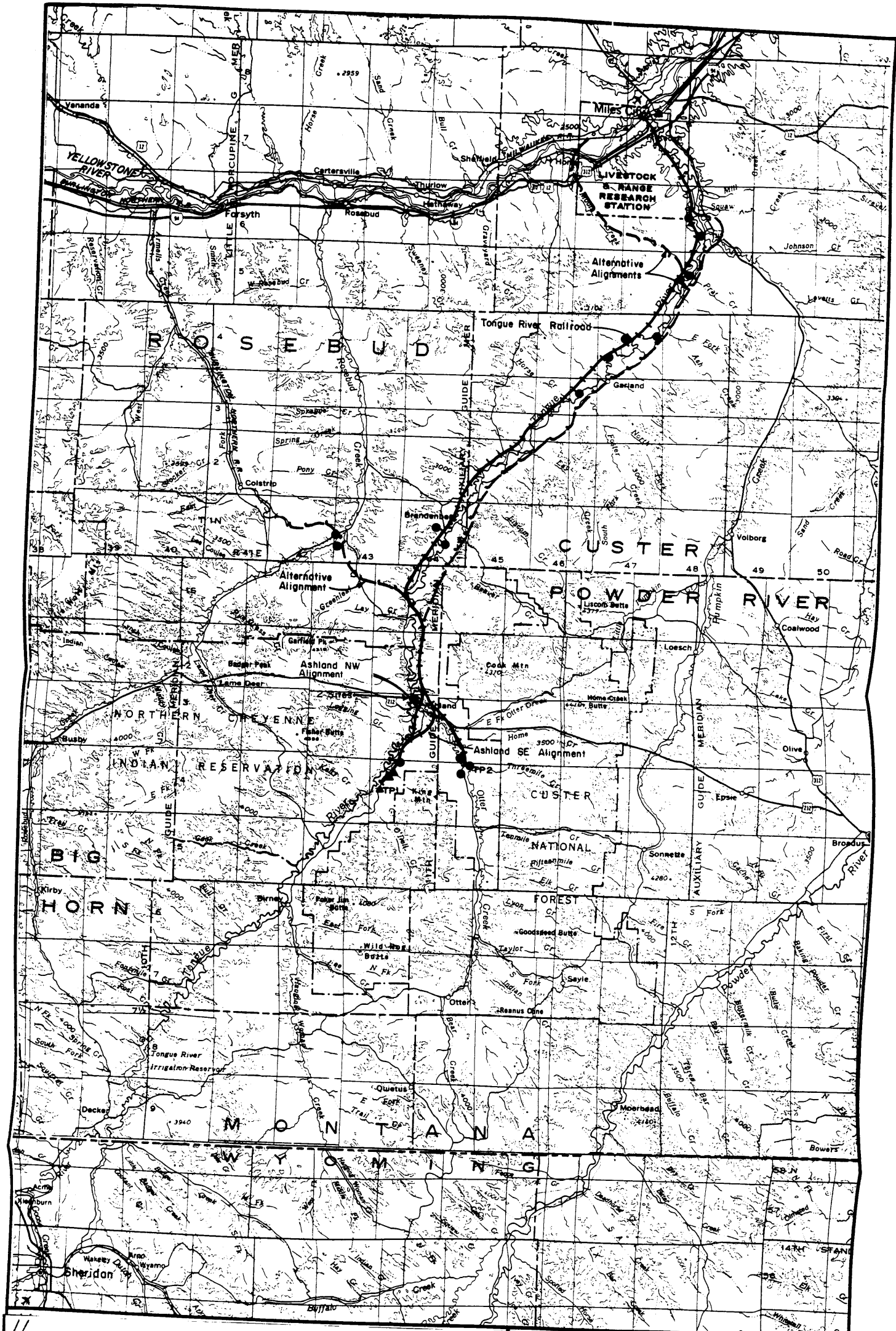
Based upon the current knowledge of cultural resource sites, the construction of either the proposed rail line or a rail line along the Colstrip alternative route would destroy two prehistoric sites, 24RB224 and 24RB228 (see Table 4-12). Site 24RB228 is eligible for nomination to the National Register of Historic Places and, therefore, would require mitigation before the construction of the right-of-way through the area. Site 24RB224 is ineligible for the Register and,

TABLE 4-12

CULTURAL RESOURCE SITES

SITE NUMBER, SITE TYPE	NATIONAL REGISTER STATUS	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE
SITES WITHIN THE RIGHT-OF-WAY					
TRR-2, Campsite	Undetermined			X	
TRR-4, Campsite	Undetermined			X	
TRR-121, Ranch Complex	Unevaluated/ unrecorded	X		X	
24CR62, Lithic workshop	Probably ineligible		X		
24CR154, Campsite	Undetermined			X	
24CR360, Log ranch complex	Probably eligible	X		X	
24CR362, Garland School	Probably ineligible		X		
24RB224, Lithic procurement	Ineligible	X	X	X	X
24RB228, Campsite	Eligible	X	X	X	X
TOTAL		4	4	7	2
SITES WITHIN A 3,000-FOOT CORRIDOR					
TRR-1, Campsite	Undetermined			X	
TRR-3, Campsite	Undetermined			X	
TRR-6, Miles City Water Treatment Plant	Eligible	X	X		
TRR-8, Petroglyph	Undetermined			X	
TRR-20, Ranch complex	Probably eligible	X			
TRR-21, Bulldozed homestead	Probably ineligible		X		
TRR-22, Log ranch house	Probably eligible	X			
TRR-43, Ranch complex	Probably ineligible				X
TRR-56, Ranch complex	Probably ineligible	X	X	X	X
TRR-101, Homestead shacks	Probably ineligible		X		
TRR-102, Cattle shed	Probably ineligible		X		
TRR-103, Log homestead	Probably ineligible		X		
TRR-104, Ranch complex	Probably ineligible		X		
TRR-105, Historic grave	Probably ineligible		X		
TRR-106, Log house w/grave	Probably ineligible		X		
TRR-107, Ranch complex	Probably ineligible		X		
TRR-108, Homestead shacks	Probably ineligible		X		
TRR-109, Homestead complex	Probably ineligible	X	X	X	X
TRR-110, School	Probably eligible	X	X	X	X
TRR-111, Foundations	Probably ineligible	X	X	X	
TRR-112, Ranch complex	Probably ineligible	X	X	X	
TRR-113, Ranch complex	Probably ineligible	X	X	X	
TRR-114, Homestead complex	Probably eligible				X
TRR-115, Ranch complex	Probably ineligible		X		
TRR-116, Ranch complex	Undetermined	X	X	X	
TRR-117, Ranch complex	Undetermined	X	X	X	
TRR-118, Ranch house	Undetermined		X		
TRR-119, Ranch complex	Undetermined	X		X	
TRR-120, Milwaukee Station	Probably eligible	X	X		
TRR-201, Martin Two Bull's house	Probably eligible	X		X	X
TRR-202, Julia Fire Crow's residence	Probably eligible	X	X	X	X
24CR50, Bison jump	Probably eligible	X	X		
24CR157, Lithic workshop	Probably ineligible		X		
24CR158, Lithic procurement	Probably ineligible		X		
24CR352, Homestead	Probably eligible		X		
24CR353, Ranch complex	Probably ineligible		X		
24CR354, Ranch complex	Probably ineligible		X		
24CR355, School house	Probably ineligible		X		
24CR356, Ranch complex	Probably ineligible		X		
24CR357, Trash dump	Probably ineligible		X		
24CR358, Ranch complex	Probably ineligible		X		
24CR359, Ranch house	Probably eligible	X		X	
24CR361, Foundations, Piper Dan's Stage Station	Probably eligible		X		
24CR363, Ranch complex and School house	Probably ineligible	X		X	
24CR364, Ranch house	Probably ineligible		X		
24CR365, Garland Store	Probably ineligible		X		
24PR30, Stone Circle	Probably eligible	X	X	X	X
24PR273, Ranch complex	Probably ineligible	X	X	X	X
24PR568, Campsite	Probably eligible	X	X	X	X
24PR1150, Campsite	Unevaluated	X	X	X	X
24RB166, Ranch complex	Ineligible	X	X	X	X
24RB171, Railroad grade	Ineligible	X	X	X	X
24RB219, Lithic procurement	Ineligible	X	X	X	X
24RB220, Campsite	Ineligible	X	X	X	X
24RB221, Middle and Late Plains Archaic Campsite	Eligible	X	X		
24RB222, Lithic workshop	Ineligible	X	X	X	X
24RB225, Campsite	Ineligible	X	X	X	X
24RB896, Campsite	Probably ineligible	X		X	
24RB898, Log homestead	Probably eligible				X
24RB899, Ranch complex	Probably ineligible				X
24RB900, Log homestead complex	Probably eligible				
24RB901, Foundations	Probably ineligible	X		X	
24RB902, Ranch complex	Probably ineligible				
24RB904, Open campsite	Probably eligible	X	X	X	X
24RB1225, Tool cache	Probably eligible	X		X	
24RB1230, Campsite	Probably ineligible	X		X	
24RB1232, Lithic workshop	Probably ineligible	X		X	
24RB1233, Campsite	Probably eligible	X		X	
TOTAL		36	50	34	22





LEGEND

FIGURE 4.8

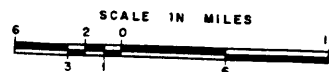
- Potentially eligible cultural site
- ▲ Eligible cultural site
- TP Terminal Point
- Proposed Action
- - - Alternative Routes

KNOWN ELIGIBLE & POTENTIALLY ELIGIBLE CULTURAL SITES

TONGUE RIVER RAILROAD COMPANY

June 1982

Prepared by
IntraSearch
Billings, Montana



thus, need not be considered further. The Tongue River Road alternative right-of-way includes both of these sites and an additional site (24CR62) that is probably ineligible for the Register. The Moon Creek alternative right-of-way includes the same two sites and three additional unevaluated sites.

Using the predictive model discussed in section A12.1.1.1, 29 projected prehistoric sites may be found within the right-of-way of the proposed rail line. Ten percent of these sites--i.e., two or three sites--may be eligible for the National Register, based upon an average rate of eligible-to-ineligible sites. These figures are comparable to those projections for the Tongue River Road alternative route. Thirty-one sites may be located within the latter alternative's right-of-way. Ten percent, or three sites, may be eligible. The Moon Creek alternative route may affect 21 prehistoric sites, one-third fewer than the proposed rail line or the Tongue River Road alternative route. Two of these sites may be eligible for the National Register. Because the Colstrip alternative route is shorter than any of the other routes, and since it traverses a different type of terrain, fewer sites--i.e., 18 sites--may be found within its right-of-way. Two of these sites may be eligible for listing on the National Register.

Available data suggest that the prehistoric resources along the various routes are similar in nature. Lithic workshops and campsites predominate, although bison kill sites are known to exist in the area.

Historic Sites in the Rights-of-Way

Two historic sites are known to lie within the proposed rail line's right-of-way (see Table 4-12). Site 24CR360 is probably eligible for listing in the National Register, and site TRR-121 remains unrecorded and unevaluated. The two sites are also within the Moon Creek alternative route's right-of-way. The Tongue River Road alternative route contains one historic site (24CR362) that probably is ineligible for the National Register. No historic sites have been identified within the Colstrip alternative route's right-of-way.

The proposed rail line and its three alternative routes are similar in terms of the projected number and types of historic sites that may be located during intensive rights-of-way surveys: four sites for the proposed rail line, of which two sites have thus far been located; four to five sites for the Tongue River Road alternative route; three sites for the Moon Creek alternative route; and two to three sites for the Colstrip alternative route. One of the sites located within the proposed rail line's right-of-way probably is eligible for the National Register. Each alternative may contain one National Register eligible historic site within its right-of-way. Available data suggest that homestead/ranching-related sites predominate in the area.

Prehistoric Sites within 1,500 Feet of the Centerline
Exclusive of the Right-of-way

Fifteen prehistoric sites are located within the proposed rail line's 3,000-foot corridor, exclusive of those sites situated within the right-of-way (see Table 4-12). One site has not been evaluated for significance using National Register criteria. Nine sites have been assigned preliminary eligibility recommendations. Three of these sites are probably ineligible and six are probably eligible for the National Register. Formal determinations of eligibility have been made for five sites: four have been determined ineligible and one (24RB221) eligible for the National Register. This eligible site also would lie within the alternative routes' corridors. However, this site most probably would not be affected adversely by vibration from construction activities or by related visual or audible impacts. Sites with tentative recommendations will have to be reviewed by the State Historic Preservation Officer, and the unevaluated site will require further on-site work prior to determining its Register eligibility. The four ineligible sites need not be considered further.

The Tongue River Road alternative route involves 12 prehistoric sites within its 3,000-foot corridor. Yet only two of these sites are exclusive to this route. The remaining 10 sites are found within the proposed rail line's 3,000-foot corridor. One of these sites is unevaluated, four sites (24CR50, 24PR30, 24RB904, and 24RB568) have tentative recommendations of probable eligibility for the National Register; four sites have been formally determined ineligible, and one eligible for the National Register. This eligible site (24RB221) is the same site identified for the proposed rail line. The two sites exclusive to this alternative (24CR157 and 24CR158) have been assigned tentative recommendations. Both sites are probably ineligible for the National Register.

Sixteen prehistoric sites lie within the Moon Creek alternative route's 3,000-foot corridor. Two of these sites are exclusive to this route. The remaining 14 sites are found within the proposed rail line's corridor. One of these sites is unevaluated; three sites are probably ineligible; five sites are probably eligible; four sites formally have been determined ineligible for the National Register. The eligible site (24RB221) is the same site identified for the proposed rail line. The two sites exclusive to this alternative (TRR-1 and TRR-3) are unevaluated campsites and will require further on-site work prior to determining their Register eligibility.

Nine prehistoric sites are located within the Colstrip alternative route's 3000-foot corridor. All of these sites also are situated along the proposed rail line's corridor. One of these sites is unevaluated; three sites are probably eligible for the National Register; four sites formally have been determined ineligible for the Register; and one site holds a formal determination of eligibility. The eligible site (24BR221) is the same site identified for the proposed rail line. The unevaluated site would require further on-site

work prior to determining its Register eligibility. Sites carrying preliminary eligibility recommendations will require review by the State Historic Preservation Officer.

Historic Sites Within 1,500 Feet of the Centerline
Exclusive of the Right-of-way

Historic sites, especially those sites containing standing structures, are most apt to be adversely affected by vibration and by visual and audible impacts caused by construction activities. Of the 21 sites located along the route of the proposed rail line, 3 sites with standing structures remain unevaluated. Fifteen sites have been given preliminary eligibility recommendations. Seven of these are probably eligible and eight are probably ineligible for nomination to the National Register. Two sites (24RB166 and 24RB171) have been formally evaluated to be ineligible. One site, the Miles City Water Treatment Plant, already is listed on the National Register of Historic Places. It is situated approximately 150 yards from the abandoned Milwaukee Road rail line. This site should not be adversely impacted by the operation and the maintenance of the TRRC, as it would be buffered visually from the rail line by a grove of trees. The Willow Crossing School (TRR-110), is probably eligible for the Register. This site currently includes no existing buffer from potential visual or audible impacts. The remaining six probably eligible sites contain standing structures susceptible to visual and audible impacts, including two Northern Cheyenne Indian dwelling sites that may be included in a district nomination.

The Tongue River Road alternative route involves almost twice as many sites (38 in number) within its 3,000-foot corridor as does the proposed rail line. Twenty-three of these sites are exclusive to this alternative route. One site (TRR-118) is unevaluated; three sites (24CR352, 24RB900, and 24CR361) are probably eligible and 21 sites are probably ineligible for the National Register of Historic Places. The remaining 15 sites also are located along the route of the proposed rail line. One of these sites (TRR-6) has been determined eligible for the National Register. Two sites (TRR-110 and TRR-120) are probably eligible.

The Moon Creek alternative route involves 18 historic sites within its 3,000-foot corridor, one of which is specific to this alternative. This site (TRR-8), a petroglyph, is unevaluated.

Thirteen historic sites lie within the Colstrip alternative route's 3,000-foot corridor. Four of these sites are specific to this route. Sites 24RB898 and TRR-114 probably are eligible for the Register. Neither site has an existing buffer that would shield it from visual or audible impacts.

4.12.1.2 Indirect Impacts

The construction of the proposed rail line or its alternative routes would require changes in current land use patterns, thereby providing access to previously remote areas. In such cases, individuals consciously or unconsciously may impact cultural resource sites by vehicle use and by the casual collecting of artifacts. National Register eligible prehistoric and historic sites, located within the selected route's 3,000-foot corridor, may be subjected to this type of indirect impact.

4.12.1.3 Mitigative Measures

The first task in mitigating impacts to National Register eligible properties would be to conduct an intensive field survey of the affected right-of-way, prior to railroad construction. Both determination of effect and impact mitigation measures then could be stipulated by the Interstate Commerce Commission (ICC), in consultation with the President's Advisory Council on Historic Preservation and with the Montana State Historic Preservation Office.

The mitigation of any direct impacts to prehistoric sites may include in-place preservation, avoidance, or data recovery that addresses defensible research questions. Impacts to those types of cultural resources identified in the project area generally can be mitigated by data recovery, rather than by in-place preservation.

The mitigation of site impacts resulting from machinery vibration can be achieved by stabilization measures designed to minimize or to obviate this cause. Visual and audible impacts to cultural properties are not easily mitigable. However, barriers--such as tree buffers--have been applied effectively to mitigate these impacts.

Plans to mitigate any indirect impacts to a National Register eligible site may include the periodic monitoring of the site to determine the extent of impact. The effective management of construction crews also can help to mitigate possible indirect impacts.

4.12.2 Operation and Maintenance

Vibration from passing trains would impact cultural resource sites as a result of the operation and maintenance of the proposed railroad or its alternatives. Visual and audible impacts, unless buffered by topography or vegetation, can disrupt the historic association of a site and, therefore, can affect its National Register eligibility. Prehistoric pictographs, prehistoric petroglyphs, and historic sites involving standing structures are the site types most susceptible to this type of impact. However, no such prehistoric sites are located within the 3,000-foot corridor of the proposed railroad or of its alternative routes.

Historic sites with standing structures are those sites most apt to be impacted by the operation and maintenance of the proposed rail line or its alternative routes. However, the operation and maintenance impact area should not extend beyond the selected route's 3,000-foot corridor.

Eighteen historic sites containing standing structures thus far have been identified within the proposed railroad's 3,000-foot corridor. The predictive model developed in section A12.1.1.1 indicates that approximately 22 percent (three to four sites) of these should be eligible for nomination to the Register. During preliminary evaluations, however, eight sites (44 percent) have been recommended as probably eligible. This higher proportion of eligible to ineligible sites is due somewhat to the character of the project area. The Miles City Water Treatment Plant, already listed in the Register as a water-pumping plant, should not be adversely impacted by the operation and the maintenance of the rail line. A tree buffer would protect it from visual and audible impacts. Three of the seven remaining sites believed to qualify for the National Register (TRR-20, TRR-22 and 24CR359) include natural buffers. Two sites (TRR-110 and TRR-120) have no existing buffer. Site TRR-120, the Milwaukee Road Station, should not be impacted adversely by the operation and maintenance of the proposed rail line, since the original function of the site is associated directly with railroad activity.

Thirty-two sites with standing structures are located within 1,500 feet of the Tongue River Road alternative route's 3,000-foot corridor. Approximately seven of these sites could be eligible for the National Register. Only the Miles City Water Treatment Plant currently is known to be eligible. This site should not be impacted by the operation of the railroad. The four additional sites with structures (24RB900, 24CR352, TRR-110, TRR-120, TRR-201, and TRR-202) are probably eligible for the Register. Sites 24RB900 and TRR-120 should not be impacted by the proposed railroad. Sites 24CR352 and TRR-110 may be affected adversely, since the sites currently include no existing buffer to shield them from visual and audible impacts.

The Moon Creek alternative route has 13 sites with standing structures situated within its 3,000-foot corridor. The predictive model suggests that 3 of these 13 sites may be eligible for nomination to the National Register. Four sites (TRR-110, 24CR359, TRR-201, and TRR-202) have already been evaluated as probably eligible. Two of these sites (TRR-110 and 24CR359) may be impacted by the operation of the railroad, since the sites have no existing buffers. In addition to the sites with standing structures, the Moon Creek alternative route has an historic petroglyph (TRR-8) that, if determined eligible for National Register nomination, might be adversely affected by the railroad operation.

The Colstrip alternative route involves 13 historic sites with standing structures within its 3,000-foot corridor. Applying the predictive percentage of National Register eligible sites to this number

suggests that 3 of these 11 sites would be eligible. Five sites (24BR898, TRR-110, TRR-114, TRR-201, and TRR-202) already have been recommended as potentially eligible for the Register. Three of these sites (24RB898, TRR-110, and TRR-114) could be affected adversely by the proposed rail line, since they currently include no vegetative or topographic buffers.

4.12.3 Related Actions

The development of those surface coal mines that would be served by the TRRC would directly impact some cultural resource sites eligible for listing on the National Register of Historic Places. The number of those sites to be impacted can be estimated by applying the same site density projections presented in Section A12.1.1.1.

Assuming the operation of five surface coal mines, under the high coal production scenario, as many as 500 prehistoric sites and 63 historic sites might be impacted by coal development in the TRRC service area (see Table A12-6). Of this total, an estimated 10 percent of the prehistoric sites (50 sites) and 22 percent of the historic sites (14 sites) may be eligible for nomination to the National Register of Historic Places. These related action impacts are projected to be the same for the proposed railroad and for its three alternative routes.

In most cases, the mitigation of any adverse affects to both prehistoric and historic sites could be accomplished by means of a data recovery process.

4.12.4 Overall Impact

The Tongue River Railroad would directly impact cultural resource sites by destroying sites located within its right-of-way and by creating visual or audible impacts to sites located beyond the right-of-way but within an area 1,500 feet either side of the centerline. One prehistoric National Register eligible site would be destroyed by the railroad. An additional prehistoric site that would be destroyed along the Tongue River Road alternative route would require formal evaluation for its National Register eligibility, although it has been evaluated as probably eligible. Three additional prehistoric sites that would be destroyed along the Moon Creek alternative route remain unevaluated. The proposed rail line and Moon Creek alternative route include a historic site impacted by the right-of-way that would require determination of National Register eligibility. An additional historic site, located in the rights-of-way of the two routes, has been evaluated as probably eligible. The one historic site in the right-of-way of the Tongue River Road alternative route is probably ineligible. A predictive model was used to project the occurrence of two to three prehistoric sites and one historic site, all of which would be eligible National Register sites, along the right-of-way during an intensive survey. Such a field survey would be required prior to stipulation of the determination of effect and impact measures as part of the approval process.

Varying by route, one eligible and three to seven probably eligible prehistoric sites and one eligible and four to seven probably eligible historic sites that have been located within the 3,000-foot corridor would be subject to audible/visual impacts. Zero to three prehistoric sites and zero to four historic sites in the 3,000-foot corridor remain unevaluated. Four to eight historic sites with standing structures that are either eligible, projected eligible, or evaluated as being probably eligible could experience audible/visual impacts due to the railroad's operation. Barriers could be used to mitigate audible/ visual impacts.

Indirect impact from changed land uses or from increased public accessibility would occur, which could be mitigated by periodic monitoring.

Coal mining could result in direct impacts to 50 prehistoric and 14 historic sites that could be National Register eligible. Data recovery would most likely mitigate most of the impacts.

4.13 AESTHETIC RESOURCES

Construction and operation of the proposed railroad and mines would affect the aesthetic resources of the project area. These impacts are presented in the following section. The impacts were assessed using the high scenario of TRRC train traffic, in order to present a "worst case" analysis of impact. Under the "No Action" Alternative, the railroad and mines would not be developed. Consequently, the project area's aesthetic resources would not be affected and the area landscape would retain its overwhelmingly agricultural characteristics.

4.13.1 Construction

The construction of either the proposed rail line or the alternative routes generally would produce a very low to moderate long term impact on the project area landscape. The rail line's visual contrast with the project area's landscape subtypes is minimal, with the exception of several large cuts into ponderosa pine/upland slopes and mesas. However, the construction of a 30- to 35-foot fill, crossing the Burlington Northern line near Miles City, would visually impact Spotted Eagle Recreation Area. The Ashland NW Alignment would avoid the severe cut near Ashland, associated with the proposed rail line, that would create strong visual contrasts south of Ashland.

Some short term impacts to the area's landscape would be caused by the construction of the rail line. These impacts would be most evident in the vicinities of Miles City and Ashland, and within the major transportation corridors. The Moon Creek alternative route would avoid visual impacts in the vicinity of Miles City and U.S. Highway 10. However, additional visual impacts would occur because of the con-

struction of the superspan bridge over the Yellowstone River. The construction of the Colstrip alternative route would generate short term visual impacts on Colstrip, but would avoid impacts to Miles City, to U.S. Highway 10, and to U.S. Highway I-94.

TABLE 4-13

SUMMARY OF IMPACTS TO AESTHETIC RESOURCES

	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE
(1) IMPACTS TO LANDSCAPES (in miles)				
Very low	48.2	61.3	46.9	18.7
Low	33.2	15.5	30.8	21.0
Moderate	5.1	8.1	7.9	5.5
High	1.8	1.8	1.8	1.8
(2) IMPACTS TO SUAs (2011) ^a				
Very low	4	4	1	-
Low	8	6	2	1
Moderate	9	9	6	7
High	<u>1</u>	<u>3</u>	<u>1</u>	<u>1</u>
TOTAL	22	22	10	9

^a Sensitive Use Areas (SUA) are areas where railroad operation will constitute a visual intrusion

4.13.2 Operation and Maintenance

The operation of trains over the proposed rail line would create high-level aesthetic impacts to the landscape's scenic quality along 1.8 miles of its route. Moderate-level impacts would be produced along 5.1 miles of this alignment, and low impacts would occur to 33.2 miles of the route. However, the operation of trains over the proposed rail line would cause only very low impacts to the scenic landscape along 48.2 miles, or 55 percent, of its alignment.

During the analysis period (1987-2011), TRRC trains operating on the proposed railroad would be within view of 22 existing Sensitive Use Areas (SUA). The impacts to these SUAs are expected to range between the very low and the moderate levels. An increase in train traffic after 1996 correspondingly would increase impacts to the SUAs. One of these SUAs potentially would incur a high-level visual impact. The Ashland NW Alignment would have greater visual impacts on Ashland than would the Ashland SW Alignment, because of its location in a central part of the community.

The visual impacts to the landscape's scenic quality caused by the operation of the Tongue River Road alternative route would be similar to those impacts produced by the proposed rail line. The Tongue River Road alternative would generate high-level visual impacts along 1.8 miles of its route, moderate visual impacts along 8.1 miles, low impacts along 15.5 miles, and very low impacts along 61.3 miles of its alignment.

The operation of the Tongue River Road alternative route would place TRRC trains within view of 22 existing SUAs. From 1987 to 1996, the visual impacts would range between the very low and the moderate levels, much as they would for the proposed rail line. After 1996, the increased train activity would produce high-level visual impacts to three SUAs.

The Moon Creek alternative route also would result in similar visual impacts as those produced by the proposed railroad. High-level visual impacts would occur for 1.8 miles of this alternative, while moderate visual impacts would be produced along 2.8 miles of the route in the vicinity of the Yellowstone River crossing, and for another 5.1 miles that correspond to the proposed rail line. Low impacts would occur on 30.8 miles of this alternative and very low visual impacts would result along 46.9 miles of the route.

The operation of the Moon Creek alternative route would place TRRC trains within the view of 10 existing SUAs. From 1986 to 1996, visual impacts to these SUAs would range from very low to moderate. After 1996, one SUA may receive a high-level visual impact, due to increased train traffic.

Visual impacts along the route of the Colstrip alternative route would be similar in degree to the impacts created along the proposed railroad and along the other alternatives. However, the shorter length of the Colstrip alignment would reduce quantitatively its overall impact. The Colstrip alternative route would create high-level visual impacts to the landscape's scenic quality along 1.8 miles of its route, moderate visual impacts along 5.5 miles, low impacts along 21.0 miles, and very low impacts along 18.7 miles of its alignment.

The operation of the Colstrip alternative route would place TRRC trains within view of nine existing SUAs. The visual impacts to these SUAs generally would range between the low and moderate levels during the analysis period (1987-2011). Because of increased train traffic after 1996, one of these SUAs may receive a high-level visual impact.

Visual impacts to the landscape's scenic quality would be minimized by means of the preparation and the implementation of detailed revegetation and erosion control plans. These programs would reduce the visual contrasts of cuts by revegetating their slopes to a degree comparable to natural conditions.

Along the routes of the proposed railroad, the Moon Creek alternative, and the Colstrip alternative, the potential visual impacts to existing SUAs in most cases could be reduced significantly or eliminated by establishing tree buffers. The visual impacts to the SUAs along the Tongue River Road alternative route would be more difficult to mitigate. Such mitigation could require a relocation of this right-of-way to the east of the Tongue River Estates and the Twelve Mile Dam Fishing Access site.

4.13.3 Related Actions

The cumulative coal-mining impacts associated with the related actions would change specific landscapes within the study area. During the mining phase, the mine permit areas would assume an industrial, rather than an agricultural, character. The five projected mine sites are located primarily in the ponderosa pine/upland slopes and mesas landscape character subtype. Thus, the landscapes most apt to be affected by the mines include the subtypes located: (1) west of the Tongue River and south of Ashland; (2) west and east of Otter Creek; (3) south of Rosebud Creek and west of FAS 447. Following reclamation, these landscapes probably would assume qualities of the shrub/grassland prairie landscape character subtype. A degree of visual diversity would be permanently lost from the ponderosa pine/upland slopes and mesas subtype, when rock croppings and highly colored shapes are removed by the mining process.

The visual effects to the existing SUAs, caused by mining, principally would involve the King Mountain Riding and Hiking Area. This area is located within the Custer National Forest, and four of the projected mine sites are adjacent to that forest. The proximity of the mines to this area may cause some visual impacts, depending upon the placement of the mining facilities. This impact potential can be analyzed only by means of site-specific environmental impact assessments. These assessments would be required before a mining company could obtain a mining permit.

4.13.4 Overall Impact

The scenic quality of the landscape along the alignments of the Tongue River Railroad would not experience significant impact. The landscape's scenic quality would sustain only low or very low impacts along 93 percent of the route of the proposed rail line. The visual impacts that would occur could be mitigated by controlling erosion and revegetating cuts. The visual impact of the coal mines would involve changing the area's landscape character from agricultural to industrial. Visual diversity would be lost with the removal of rock croppings.

Visual impact, ranging from a very low degree to a moderate degree, would happen to most Sensitive Use Areas (SUAs). By 2011, between one and three SUAs would incur high degrees of visual impact. The impacts would be similar for all the routes, although the overall

impact for the Colstrip alternative route would be quantitatively less. Visual impacts to SUAs could be mitigated by the establishment of tree buffers. The assessment of the impact of the coal mines on SUAs would require site-specific analysis, which should be undertaken for each mine prior to obtaining a mining permit.

4.14 AGRICULTURE

4.14.1 Construction

The construction of the Tongue River Railroad over the route of the proposed rail line or any of the alternative routes would primarily affect land currently being used for agricultural purposes. Most of this agricultural land is used for grazing, with a small amount being employed as cropland. A still smaller portion of this cropland is currently under irrigation. The impacts to agricultural operations discussed in this section are summarized in Table 4-1 (see section 4.1).

Under the "No Action" Alternative, the railroad and mines would not be constructed and agricultural land would not be taken out of production to support this activity. The agricultural sector of the project area economy, however, is likely to continue its historic pattern of decline. Outmigration of workers caused by a drop in employment might still affect the agricultural labor supply.

4.14.1.1 Direct Loss of Agricultural Land

Construction of the proposed rail line would result in the direct loss of 1,547 acres of land currently being used for agricultural purposes. This compares with 1,653 acres of agricultural land that will be lost along the Tongue River route, 1,717 acres along the Moon Creek route, and 1,040 acres along the Colstrip route. Approximately 2 percent of that land along the route of the proposed rail line is irrigated cropland. The figure is nearly 4 percent for the Tongue River Road alternative route, 2 percent for the Moon Creek alternative route, and less than 1 percent for the Colstrip alternative route. The Tongue River Road alternative route would require the acquisition, therefore removal from production, of 17 acres of prime farmland, and would sever 32 additional acres. None of the other routes require any prime farmland as part of the right-of-way.

The proposed railroad would affect 39 agriculturalists. For the Tongue River Road route, this figure would be 42. The Moon Creek route would affect 37 agriculturists, and the Colstrip route would affect 26 agriculturists. Two additional agricultural operations would be affected with the Ashland NW Alignment.

4.14.1.2 Displacement of Ranching Facilities

Construction of the railroad over the route of the proposed rail line or any of the alternative routes would result in the displacement of a number of facilities and capital improvements associated with agricultural operations. Total figures for such displacements, by route, are not high. In terms of impacts to specific ranching operations, however, such displacements can be significant.

Facilities displaced should construction occur along the route of the proposed rail line would include three dwellings, one additional building, three corrals, five wells, two irrigation systems, and six roads. The Tongue River Road alternative route would require the displacement of five dwellings, one other building, one corral, four wells, and two roads. The Moon Creek alternative route would displace one dwelling, one other building, three corrals, four wells, three irrigation systems, and four roads. One dwelling, one other building, five corrals, four wells, and one road would be displaced by the Colstrip alternative route.

4.14.1.3 Severance of Agricultural Parcels

In addition to direct loss of agricultural acreage due to right-of-way acquisition, agricultural operations would be adversely affected by the severance of agricultural lands, thus rendering some of them unsuitable for present uses. Cattle movements and rancher access between such parcels may be restricted. Irrigation systems may require alterations or replacement. Parcels of reduced size may no longer be economically viable agricultural units.

Estimated loss of present agricultural use resulting from severance along the route of the proposed rail line involves 1,083 acres, 44 of which are under irrigation. An estimated 647 acres would be lost to severance along the Tongue River Road route, 80 of which are under irrigation. The Moon Creek route would require the severance and expected loss of 1,100 agricultural acres, 48 of which are irrigated. An estimated 585 acres devoted to agriculture would be severed and lost to current use along the Colstrip alternative route, 13 of which are irrigated.

Irrigation systems currently in use, that would be disrupted by severance, include eight for the route of the proposed rail line, four for the Tongue River Road route, six for the Moon Creek route, and two for the Colstrip route. In addition, three planned irrigation systems would be disrupted along the route of the proposed rail line and two would be likewise affected along the Moon Creek route. Acreage of existing and potential irrigable land associated with disruption includes 415 acres for the proposed rail line, and 405 acres for the Moon Creek alternative route.

4.14.1.4 Production Losses Due to Severance and Land Aquisition for Right-of-way

Land lost to existing agricultural usage due to construction of the railroad along the route of the proposed rail line would total approximately 3,024 acres. Between 1985 and 2011, this would result in an estimated loss of agricultural income of \$3.4 million. For the Tongue River Road alternative route, acreage losses would approach 2,303 acres, with a corresponding monetary loss over the analysis period of \$1.8 million. The Moon Creek alternative route would cause 3,222 acres to be removed from production, resulting in a \$3.5 million decrease in agricultural revenues for the period. The Colstrip alternative route would require the removal of 1,625 acres from production, resulting in a projected loss of \$761,000 million for the period.

4.14.1.5 Farm and Ranch Labor Supply

The availability of unskilled labor for agricultural operations could be curtailed by construction of a railroad along any of the routes. About 50 percent of the project area ranchers hire full- or part-time workers to assist in the daily or seasonal operation of their ranches. With the number of relatively high-paying positions available during construction of the railroad, it could become more difficult to locate individuals willing to do agricultural work. It is also possible that such a situation would require farmers and ranchers to pay more for assistance, thus increasing the overall cost of operations.

4.14.1.6 Additional Impacts to Agricultural Operations

A variety of unquantifiable impacts to local agricultural operations could result from construction along the route of the proposed rail line or any of the alternative routes. In general, these impacts would result directly from increased human activity in specific areas and increased population in the project area. Most of these impacts could be included in a "nuisance" category, as they should not have a significant effect on agricultural productivity.

It can be expected that as population increases, trespass problems on agricultural lands also would increase. Similarly, vandalism, littering, and carelessness could result in impacts to farms and ranches. Construction-related accidents also could cause inconvenience and financial loss to area agriculturists.

Damaged or inadequately replaced fencing, or gates left open carelessly could result in serious consequences to ranching operations. The danger of livestock/vehicular accidents increases under such circumstances. This could result, during construction, in the loss of livestock, damage to vehicles, and possible injury to humans as well. This is a common concern among area ranchers.

4.14.2 Operation and Maintenance

Agricultural operations could be affected in several ways by the operation and maintenance of a railroad along the route of the proposed rail line or any of the alternative routes. Many of the impacts associated with construction would apply during the operation-and-maintenance phase. This is especially true of those impacts associated with the general increase in activity and population near agricultural operations.

Occasional problems related to interference with access to agricultural parcels will continue to occur as a result of daily train traffic along the railroad. At the peak of production, in 2011, as many as 25 trains per day may pass over the line. Over the route of the proposed rail line, and the Tongue River Road and Moon Creek alternative routes, trains would travel at an average speed of 38 miles per hour, resulting in a probability of crossing delay ranging from 4 to 6 percent. The average duration of such a delay would be 1.6 minutes. Due to the slower average speed that would be attained on the Colstrip route, the probability for delay would range from 5 to 7 percent and the average delay would increase to 1.8 minutes. Such delays are not likely to significantly impact overall agricultural operations, but will contribute to an inconvenience factor.

Agricultural land adjacent to the rail line, regardless of route selection, could suffer some devaluation as a result of the operation of the TRRC railroad. Such land could become less attractive for farming and ranching operations due to restrictions on usage, management problems, inconveniences, and the potential for accidental impacts associated with the railroad. Aesthetic and noise impacts may contribute to a decrease in the attractiveness of some parcels for agricultural operations.

Incidental impacts of railroad operation which might affect agricultural operations include the possibility of railroad-caused fires and the impacts of coal dust on vegetation and livestock. However, the probability that railroad-caused fires would significantly impact agricultural operations is quite low. Data from other railroads indicate that the TRRC could expect two to five fires annually, ranging in size from negligible to 5 acres. The impacts associated with coal dust are not expected to be significant, as most of the coal dust lost should settle in the right-of-way, and most loss should take place in the first few miles from the loading facility.

4.14.3 Downline Operations

Impacts to agriculture as a result of downline operations should be minimal. Additional land required for double-track mainline and sidings would not be required, as right-of-way widths along the route are sufficient to accommodate such expansion.

4.14.4 Related Actions

The proposed TRRC railroad would serve an estimated five coal mines in the Ashland/Otter Creek area. Agricultural land that would be temporarily removed from production directly as a result of mining operations could be as much as 147,158 acre-years under the high coal production scenario. The bulk of this acreage (144,656 acres) would be grazing land. The estimated loss of productivity under the high scenario would be approximately \$2.0 million.

The removal of agricultural land from production for community growth related to mine development would approach 16,550 acre-years under the high development scenario. Grazing land would again compose the bulk (92 percent) of this acreage. Under the high scenario, this would represent an approximate loss in agricultural productivity of \$274,000 for the period 1984-2011.

Land used for mining will eventually be returned to the original state. Stringent reclamation regulations require that the vegetative productivity of land disturbed for mining be returned to a level equal to or greater than existed prior to disturbance. In view of this, the effects of mining on agricultural productivity are regarded as relatively short term. However, land required for community growth related to mining is not expected to be returned to agricultural use.

Incidental impact to agricultural operations from mining would be similar to those resulting from construction and operation of the railroad. These would primarily consist of problems related to increased population and activity.

It is anticipated that employment in the agricultural sector would gradually decline as mining-related employment increases. Agricultural labor costs would likely increase and the availability of such labor would decrease proportionally. The decline in agricultural employment, however, would be small. A 2-percent decline would be experienced through 1985, a 1-percent decline from 1986-1990, and a 0.5-percent decline from 1991 through 2011.

4.14.5 Overall Impacts

The construction of the Tongue River Railroad over the route of the proposed rail line or any of the alternatives would cause the loss of agricultural land or its use through direct acquisition or severance. Overall agricultural land use losses for the route of the proposed rail line would approximate 3,024 acres with an estimated loss in productivity over the analysis period of \$3.6 million. Losses for the alternatives would range between 1,625 and 3,222 acres with a production value of between \$761,000 and \$3.5 million.

Facilities used in agricultural operations would be displaced by all of the routes. While impacts to specific farms and ranches might be significant, the overall displacement is not high for any of the

routes. The increase in population and activity associated with construction would affect agricultural operations largely from an inconvenience standpoint. The availability and the cost of labor would decrease and increase respectively as a result of construction employment possibilities.

Desirability of land for agricultural purposes may decrease for parcels adjacent to the right-of-way during operation of the line. Delays at crossings and resulting access problems for farmers and ranchers could occur during this period.

Mining operations and associated community growth related to the railroad could result in lost production totaling \$1.7 million.

4.15 SUMMARY COMPARISON OF PROPOSED ACTION AND ALTERNATIVES

The "No Action Alternative" assumes that the proposed railroad and related mines would not be constructed. Under this alternative, there would be no impact from construction of the railroad in the Tongue River Valley. From a socioeconomic perspective, there would be very little change in the total region-wide population after the completion of Colstrip Units 3 and 4 in 1986. Powder River and Custer County populations would decrease through the analysis period (1984-2010), while Rosebud County's population would grow moderately during that same period. Although the agricultural sector would continue a historic decline, there would be little structural change in the area's economy. The demand for services would grow slightly during the period. However, with the reduction in industrial development in the region, revenues to local governments also would decline. It is likely that additional tax revenues would be required to meet continuing demands for government services.

Construction of the proposed rail line would result in a number of environmental impacts. While the Proposed Action does not conflict with established land use plans in the region, some changes in current land use would result. Lands that would be lost due to construction of the right-of-way and to severance by the railroad are primarily in agricultural use. Some irrigated lands, none of which are considered prime farm land, would be affected by the construction of the rail line. Most of the impacts from construction of the railroad could be mitigated by the Tongue River Railroad Company.

The Proposed Action also will cause social and economic impacts to the three affected counties (Custer, Rosebud, Powder River). Again, most of the impacts are mitigable. Losses in agricultural production value will be more than offset by revenues received from the railroad and the proposed mines. However, population growth in the region would have some adverse effects on the social fabric of the area. Most communities have sufficient structure to accommodate the impact population. However, the communities of Ashland and, to a lesser

SUMMARY IMPACT TABLE

CATEGORY AND PARAMETER (UNITS)	PROPOSED ACTION	TONGUE RIVER ROAD ALTERNATIVE	MOON CREEK ALTERNATIVE	COLSTRIP ALTERNATIVE	ASHLAND NW ALIGNMENT ^a	"NO ACTION" ALTERNATIVE (Baseline)
4.1 LAND USE						
Total agricultural land in right-of-way (acres)	1,547	1,453	1,717	1,040	(70)	n/a
Total land in other uses in right-of-way (acres)	215	225	100	70	33	n/a
Total agricultural land lost due to severance (acres)	1,062	650	1,100	585	(144)	n/a
Total agricultural land lost due to irrigation impact (acres)	415	-0-	405	-0-	-0-	n/a
Total loss of land use (acres)	3,239	2,520	3,322	1,695	(101)	n/a
Affected landowners: Number with lands in agricultural use	39	42	37	26	2	n/a
Affected landowners: Number with lands in other uses	9	10	4	4	19	n/a
Total number of affected landowners	48	52	41	30	11	n/a
Displaced houses and trailers, existing	3	5	1	1	4	n/a
Displaced corrals/holding areas, existing	3	1	3	5	-0-	n/a
Displaced wells/water tanks, existing	5	4	4	4	(1)	n/a
Displaced/disrupted irrigation systems, existing	10	4	9	2	3	n/a
Displaced roads, existing	6	2	4	1	3	n/a
Displaced homesites, proposed	1	-0-	-0-	-0-	-0-	n/a
Displaced irrigation systems, proposed	3	-0-	3	-0-	-0-	n/a
Cumulative loss of production value (all actions) (\$000s)	\$ 5,306	\$ 3,537	\$ 5,346	\$ 2,498	(\$66)	n/a
4.2 SOCIAL AND ECONOMIC IMPACTS						
Net fiscal balance for construction:						
Custer County (\$000)	\$ 3,855.3	\$ 3,855.3	\$ 3,855.3	\$ 75.0	-0-	-0-
Powder River County (\$000)	68.3	68.3	68.3	85.7	-0-	-0-
Rosebud County (\$000)	3,482.7	3,482.7	3,482.7	4,744.8	-0-	-0-
Total impact population, 2010 (medium production scenario)	6,105	6,105	6,105	6,077	-0-	-0-
Total cumulative net fiscal balance, 2010:						
Custer County (\$000)	\$ 46,752.8	\$ 46,752.8	\$ 46,752.8	\$ 186.4	-0-	-0-
Powder River County (\$000)	50,149.8	50,149.8	50,149.8	50,149.8	-0-	-0-
Rosebud County (\$000)	148,068.3	148,068.3	148,068.3	\$145,448.6	-0-	-0-
4.3 TRANSPORTATION						
Vehicle delays due to TRAC trains (2011):						
Number of delayed vehicles	2,370	2,370	2,370	1,956	-0-	-0-
Percentage of trips delayed	2.0%	2.0%	2.0%	1.6%	-0-	-0-
Projected daily traffic volume (2011):						
FAP 39, I-94 to Colstrip	1,630	1,630	1,630	1,630	-0-	780
FAP 39, Colstrip to Lane Deer	1,280	1,280	1,280	1,280	-0-	391
FAP 37, Lane Deer to Ashland	2,910	2,910	2,910	2,910	-0-	1,100
FAP 37, Ashland to Otter Creek Road (FAP 484)	3,520	3,520	3,520	3,520	-0-	429
FAP 37, Otter Creek Road to Broadus	1,970	1,970	1,970	1,970	-0-	762
FAP 23, Miles City to Broadus	970	970	970	970	-0-	510
FAP 447, Ashland to Mine Site 61 (14 miles)	825	825	825	825	-0-	210
FAP 366, Ashland to Mine Site 62 (7 miles)	215	215	215	215	-0-	133
FAP 409, U.S. 212 to Mine Sites 62 and 63	1,950	1,950	1,950	1,950	-0-	123
4.4 ENERGY						
Net energy balance, medium coal production scenario, (trillions of BTUs, 1983-2011)	8,782.4	8,779.0	8,778.0	8,772.1	-0-	n/a
4.5 AIR QUALITY						
Emissions during construction:						
Windblown dust (tons/year) -- 1983-1985	370	421	385	234	(15)	n/a
-- 1986-1987	45	45	45	45	-0-	n/a
Other dust (tons/year)	500-1,500	500-1,500	500-1,500	500-1,500	-0-	n/a
Heavy equipment emission, TSP (tons/year)	68-205	68-205	68-205	68-205	-0-	n/a
Heavy equipment emission, SO ₂ (tons/year)	78-234	78-234	78-234	78-234	-0-	n/a
Heavy equipment emission, CO (tons/year)	246-737	246-737	246-737	246-737	-0-	n/a
Heavy equipment emission, HC (tons/year)	106-317	106-317	106-317	106-317	-0-	n/a
Heavy equipment emission, NO ₂ (tons/year)	1,048-3,143	1,048-3,143	1,048-3,143	1,048-3,143	-0-	n/a
Fugitive dust emissions for operation of five mines (high coal production scenario, tons/year)	116.1	116.1	116.1	116.1	-0-	n/a
4.6 NOISE						
Projected noise levels along TRAC Railroad (high coal production scenario, 2011):						
70-dBA contour	110 feet	125 feet	140 feet	115 feet	-0-	n/a
50-dBA contour	3,470 feet	3,980 feet	4,370 feet	3,550 feet	-0-	n/a
4.7 SAFETY						
Total grade-crossing accidents, TRAC trains (medium coal production scenario, 1983-2011)	7.6	8.2	7.5	5.7	-0-	n/a
Total derailments, TRAC trains (1983-2011)	108	108	108	127	-0-	n/a
Downline accidents (medium scenario, 1983-2011)	589	589	589	589	-0-	n/a
Downline derailments (medium scenario, 1983-2011)	797	797	797	797	-0-	n/a
4.8 SOILS/GEOLOGY						
Soil with potential for slump (miles)	27.3	27.3	27.8	18.9	(1.7)	n/a
Critical soils affected (acres)	100	119	46	33	(8)	n/a
Soil lost per year to wind erosion (tons)	25,604	24,925	25,556	18,773	(2,790)	n/a
Soil lost per year to water erosion (tons)	67,500	71,200	72,100	34,600	(10,800)	n/a
4.9 HYDROLOGY AND WATER QUALITY						
Increase in sediment load to streams (tons/year)	5,400	5,700	5,700 ^b	2,800	(900)	n/a
Increase in TSS in Tongue River (mg/l)	12-13	13	13	4	(2)	5-12
Increase in TSS in Otter Creek (mg/l)	19	19	19	18	-0-	10-500
Increase in TSS in Rosebud Creek (mg/l)	-0-	-0-	-0-	15	-0-	50-1,000
4.10 AQUATIC ECOLOGY						
Number of intermittent stream crossings	34	25	34	13	-0-	n/a
Number of perennial stream crossings	2	3	2	3	-0-	n/a
Number of river crossings	1	1	2	1	-0-	n/a
4.11 TERRESTRIAL ECOLOGY						
Vegetation and wildlife habitat lost due to the right-of-way (acres)	1,278	1,413	1,323	838	(46)	n/a
4.12 CULTURAL RESOURCES						
Known sites within the right-of-way	4	4	7	2	-0-	n/a
Known sites within 1,500 feet of centerline	34	48	32	20	-0-	n/a
4.13 AESTHETIC RESOURCES						
Impacts to landscapes (in miles):						
Very low	48.2	61.3	46.9	18.7	-0-	n/a
Low	33.2	15.5	30.8	21.0	-0-	n/a
Moderate	5.1	0.1	7.9	5.5	-0-	n/a
High	1.8	1.8	1.8	1.8	-0-	n/a
Impacts to Sensitive Use Areas (SUA), 2011:						
Very low	4	4	1	-0-	-0-	n/a
Low	8	6	2	-0-	-0-	n/a
Moderate	9	9	6	-0-	-0-	n/a
High	1	2	1	-0-	-0-	n/a
TOTAL NUMBER OF SUAs:	22	22	10	9	-0-	n/a

^a Add (or subtract) these figures from each alternative to include the Ashland NW Alignment
^b Yellowstone crossing not included

extent, Birney would have more difficulty adjusting to the increased population.

Construction of the proposed rail line would have little long term impact on biological and physical resources in the project area. Temporary disturbance to soils and vegetation, to aquatic resources, and to air quality would occur, but could be mitigated by proper construction of the rail line. With regard to wildlife impacts, operation of the railroad could disrupt some movement patterns between the uplands and bottomlands. Some wildlife habitat would be lost due to construction of the right-of-way. As with other environmental effects, many potential wildlife impacts can be mitigated through careful planning and proper construction techniques.

Impacts that would occur as a result of mining operations in the Tongue River Valley are expected to be more significant than impacts from construction of the TRRC's proposed railroad. Changes that necessarily would occur as a result of railroad and mine development, such as increased population and a switch from an agricultural to an industrial economic base, would impact local communities. Once again, the communities of Miles City, Colstrip, Forsyth, and Broadus are most able to accommodate the increased population. The communities of Ashland and Birney would receive the most adverse impacts from industrial development of the Tongue River Valley.

Impacts to biological and physical resources would be most pronounced in the area of soils and hydrology. On a localized basis, surface and ground water would be disrupted, although the cumulative affect on the normal river flow would be small. Although the alluvial ground water quality should not be impacted beyond specific mining areas, significant water quality changes could occur in the spoils ground waters. The increases in Total Dissolved Solids (TDS) concentrations, however, would not alter the suitability of water for current uses. With regards to soils, available data suggest that unaffected soils may cover the area sufficiently to provide adequate surface soil for reclamation after mining. However, the majority of the soils in the project area exhibit poor reconstruction suitability ratings, a condition which increases the cost of reclamation. In the case of both hydrologic and soils impacts from mining, the regulatory regime in force in the State of Montana would require the preparation of adequate reclamation and hydrologic plans for each mine.

The overall environmental impact from the construction and the operation of a railroad to serve coal mines in the Tongue River Valley does not vary greatly by routing alternative. Furthermore, since any of the routes would serve the same coal mines, the impacts from related actions do not differ by alternative. The detailed analysis by route contained in the DEIS addresses the impacts, both specifically and cumulatively. Despite the similarity between alternative routings, there are some differences between the proposed rail line and its alternative routes.

The Tongue River Road alternative route would utilize an existing transportation corridor, thereby limiting, to some extent, the necessity to sever agricultural parcels and to disturb irrigation systems. It would, however, result in the loss of approximately 17 acres of prime farmland to the right-of-way, and an additional severance of 37 acres of prime farmland. The displacement of homes on the Tongue River Road route also will be higher than if the route of the proposed rail line is selected. Slightly more acreage would be needed for the right-of-way of the Tongue River Road route, although it does not differ substantially from the proposed rail line. The Tongue River Road alternative route does not differ from the proposed rail line in its affect to the Livestock and Range Research Station (LARRS).

The most important advantage of the Moon Creek alternative route is that it limits the impacts to the LARRS which would occur along the proposed route and the Tongue River Road alternative route. The route would traverse only 2.5 miles of the southwestern corner of that facility. It would not be likely that ongoing research activities would be significantly affected. The Moon Creek alternative route would, however, require the greatest acreage for right-of-way construction of any of the alternatives. The only other significant difference in the Moon Creek route would be the requirement of the construction of a railroad bridge across the Yellowstone River. None of the other routes under consideration include a Yellowstone crossing. The resulting potential for impacting aquatic resources would be greater than for any other route. Moreover, the Yellowstone crossing would require a Section 10 permit from the U.S. Army Corps of Engineers.

The Colstrip alternative route, by virtue of the considerably shorter distance involved, would result in proportionally fewer environmental impacts than either the proposed rail line or other alternatives under consideration. It would avoid impacts to the LARRS entirely. However, increased rail traffic in the Colstrip and Forsyth areas would result in more vehicular delays in those communities. A slightly greater percentage of the construction-and-operation impact population would be located in Colstrip, should this route be selected. In addition, rail line construction activities and train operations would contribute to existing air quality problems in the vicinity of Colstrip.

5.0 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION AND ITS ALTERNATIVES

The Tongue River Railroad Company's (TRRC) construction of the proposed railroad, or any of its alternatives, would cause some unavoidable environmental impacts. The following section summarizes these impacts and, where appropriate, distinguishes the effects among the alternative alignments.

5.1 LAND USE

The proposed railroad or its alternatives would remove between 1,695 surface acres and 3,322 surface acres from their current usage in the project area. This land either would be used in the construction of the right-of-way, or it would be severed by the right-of-way and, therefore, become unusable for current agricultural purposes. In addition to this direct/indirect disturbance, 200 acres would be affected by the establishment of temporary construction camps, and another 200 acres would be impacted for new borrow sites. The removal of this acreage from agricultural production would constitute an unavoidable adverse impact.

During the 27-year period 1985 to 2011, the cumulative agricultural production loss resulting from the construction of the railroad, from the associated mine development in the TRRC service area, and from related community growth represents a monetary loss of between \$2.4 million and \$5.1 million. This loss in agricultural productivity would be unavoidable. However, the overall increases in the region's economic productivity would overshadow the monetary loss within its agricultural sector.

The construction of either the proposed railroad, the Tongue River Road route, or the Moon Creek route, and the associated mining developments also would affect several research projects at the U.S. Department of Agriculture's Livestock and Range Research Station (LARRS) near Miles City. Some long term research projects, currently underway at the Station, would be either directly or indirectly affected by the rail line. This situation would result in the loss of some scientific information. The Moon Creek alternative would cross the western edge of the LARRS, but would affect no permanent vegetation research plots. The route could have a negative effect on animal research being conducted in pastures adjacent to the right-of-way. The Colstrip alternative route would not impact the LARRS.

5.2 TRANSPORTATION

The operation of the proposed rail line would increase vehicle delays in both urban and rural areas, although the percentage of trips delayed would be minimal. Emergency vehicles also would be delayed, with the greatest percentage of these delays existing in the community of Forsyth. Downline communities would experience only minimal emergency vehicle delays.

The vehicular traffic volumes on the project area's primary and secondary highways also would increase as a result of the construction of the railroad. FAP 39 and FAP 37 would experience the greatest increase, with a rise from 1,200 cars per day to 1,630 cars per day by the year 2011 on FAP 39. Traffic on FAP 37 would increase from 940 cars per day to 2,910 cars per day during the same period. These unavoidable impacts to the project area's transportation patterns would require that improvements be made to some elements of its federal highway system.

5.3 AIR QUALITY

Adverse impacts to the project area's air quality from gaseous pollutants, caused by the operation of the railroad and the related mines, would be minimal. Total suspended particulate matter (TSP) concentrations would reach significant levels during the construction phase, but they would diminish considerably with the completion of construction and the beginning of railroad operations.

TSP levels would increase significantly over existing conditions with the construction of the five projected mines. TSP emissions would become particularly significant along unpaved county roads and access roads, should these roads not receive improvement. These unavoidable impacts would exist for the duration of operations at the various mines.

5.4 NOISE

Ambient noise levels would increase with the construction, with the operation, and with the maintenance of the proposed rail line. However, the construction-related noise impacts would be only temporary. By 2011, under the high coal production scenario, the 70-Adjusted Decible (dBA) contour line would be extended to a distance approximately 100 feet on either side of the rail line. Although urban residences would not be situated within the 70-dBA contour line, a few rural residences would be located within its boundary. The increased noise levels may exert an affect on property values for land and structures located near the rail line.

5.5 SAFETY

Grade-crossing accidents would increase minimally because of the construction and the operation of the proposed rail line. Only a few injuries and fatalities would result. Approximately six derailments would occur within the project area between 1987 and 2011.

5.6 SOILS

Soil loss caused by wind and water erosion would exist along the route of the proposed rail line or its alternatives. In addition, some soil slumping might occur within a small portion of the affected right-of-way. Soil loss would be most pronounced during the construction phase and, thus, would be only temporary in nature. The successful stabilization of the cut-and-fill slopes and the reclamation of the right-of-way would reduce the impact of soil loss.

Generally, soil loss due to mining operations in the project area would be mitigated by successful reclamation. However, some soils within the proposed mining areas exhibit poor reconstructive qualities, thereby making reclamation more difficult.

5.7 HYDROLOGY AND WATER QUALITY

Unavoidable temporary increases in suspended sediment and turbidity would occur with the construction of stream and river crossings. In addition, stream sediment loads would increase somewhat from disturbed soil subject to wind and water erosion. This impact would cause insignificant changes in long term water quality.

Surface waters are not expected to be significantly impacted by the railroad or mining. However, there would be impacts to ground water from mining. Total Suspended Solids (TSS) in the Tongue River and Otter Creek would increase in the mining and post-mining periods, but should not cause a change in the suitability of water for current uses. Some area wells would be unavoidably impacted and could experience a lowering of the water level.

5.8 AQUATIC ECOLOGY

Some permanent loss of aquatic habitat would occur as a result of construction activities along stream banks and in streambeds. In addition, some alteration of aquatic habitat could result from stream channeling, if it becomes necessary, and from the installation of erosion control structures on stream banks. Some impact also would develop from the permanent increase in the susceptibility of aquatic

resources to accidental effects caused by the introduction of toxic materials into the waterway--i.e., from spills of oil, diesel fuel, or herbicides.

Most long term aquatic impacts generated by the development of project area mines would be minimized by the application of appropriate state and federal regulations. However, some long term impacts to aquatic resources would result from the area's increased human population and from the consequential rise in the recreational use of its rivers and streams.

5.9 TERRESTRIAL ECOLOGY

The proposed railroad and its related developments temporarily would destroy vegetation on all disturbed areas. In most areas, however, reclamation practices would restore the ground cover and the vegetative productivity to their present levels. Specialized reclamation technology may be necessary where poor quality growth mediums or steep slopes prevail.

The vegetative species composition and community diversity may be substantially different in the revegetated areas. The revegetated areas would be less diverse than are native communities, because native species are not commercially available and because early season weed/grass species offer significant competition to invading species.

The construction of the TRRC railroad and the related mines would cause a temporary loss of wildlife habitat, with the loss being permanent in those areas where permanent structures and trackage are located. The reclamation of the disturbed sites to carry a variety of native shrubs, forbes, and grasses would return the wildlife habitat to its current level, except in forested areas. Increased wildlife mortality is likely to occur as a result of vehicular activity during the construction phase. In addition, the increase in the project area's human population would exert an unavoidable impact on local wildlife, with the most noticeable impacts affecting big game species.

5.10 AESTHETIC RESOURCES

The visibility of TRRC trains from state, federal, and county roads in the vicinities of Miles City and Ashland would create an unavoidable impact associated with the proposed railroad. Adverse impacts primarily would impinge upon the landscape's scenic quality where landform cuts and fills would alter the natural terrain and would disrupt Ponderosa pine and deciduous tree stands. The presence of railroad sidings and trains, throughout the life of the project, also would exert unavoidable adverse visual impacts on the landscape's scenic quality.

The landscape of the study area would be modified during the life of the associated coal mines. The post-mining land contours would be different from the pre-mining contours. However, during the decades following the mining phase, the mine site landscape progressively would blend with the surrounding countryside.

5.11 CULTURAL RESOURCES

The construction of the proposed rail line would directly impact four cultural resource sites. Additional sites could be found during an intensive survey of the proposed right-of-way. Following the intensive survey, the assessment of the sites' National Register of Historic Places eligibility and the determination of effect would be made by the Interstate Commerce Commission, in consultation with the Montana State Historic Preservation Office. Plans for mitigating adverse impacts would be made at that time, in consultation with the President's Advisory Council on Historic Preservation.

Impacts to National Register eligible sites would be unavoidable. However, appropriate data recovery procedures would mitigate most adverse impacts.

